PB86-119906

Carbon Monoxide Analysis of Future Attainment of the NAAQS (National Ambient Air Quality Standard) in Wichita, Kansas

PEI Associates, Inc., Cincinnati, OH

Prepared for

Environmental Protection Agency, Kansas City, MO

Jun 85

U.S. Department of Commerce
National Technical Information Service
NTIS

PB86-119906

United States
Environmental Protection
Agency

Region 7
324 E. 11th St.
Kansas City, MO 64106

EPA 907/9-85-004
June, 1985

Air and Toxic Division

EPA

Carbon Monoxide Analysis of Future Attainment of the NAAQS

in Wichita, Kansas

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

EPA 907/9-85-004

CARBON MONOXIDE
ANALYSIS OF FUTURE ATTAINMENT OF THE NAAQS IN WICHITA, KANSAS

by

G. J. Schewe
PEI Associates, Inc.
11499 Chester Road
Cincinnati, Ohio 45246-0100

Contract No. 68-02-3890
Work Assignment No. 10
PN 3655-10

Project Officer

Robert Chanslor

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION VII, AIR BRANCH
324 EAST 11TH STREET
KANSAS CITY, MISSOURI 64160

June 1985

DISCLAIMER

This report was furnished to the United States Environmental Protection Agency by PEI Associates, Inc., Cincinnati, Ohio 45246, in fulfillment of Contract Number 68-02-3890. The opinions, findings, and conclusions expressed are those of the authors and not necessarily those of the Environmental Protection Agency or of cooperating agenies. Mention of company or product names is not to be considered as an endorsement by the Environmental Protection Agency.

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA 907/9-85-004		

4. TITLE AND SUBTITLE	5. REPORT DATE
Carbon Monoxide Analysis of Future Attainment of the NAAQS in Wichita, Kansas	June 1985
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO. 68-02-3890
12. SPONSORING AGENCY NAME AND ADDRESS Environmental Protection Agency, Region VII Air Branch 726 Minnesota Avenue Kansas City, Kansas 66101	13. TYPE OF REPORT AND PERIOD COVERED Final
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

In order to comply with the NAAQS for CO in Wichita, Kansas, a special study was performed to demonstrate that CO concentrations at a special purpose monitor (SPM) located near Douglas and Main Streets would give results less than the NAAQS by 1987. The SPM site is located near the urban core in an area characterized by high nighttime traffic volumes and congested traffic flow. Exceedances of the 8-hour NAAQS were measured in 1983 and early 1984 with no exceedances since January 8, 1984. A dispersion modeling analysis was performed using the CALINE-3 Model for dispersion, the MOBILE-3 Model for vehicle emissions, and local or national traffic and ambient conditions. Background concentrations were derived from other monitors in the area. Results of modeling the SPM site for baseline (1983) emissions were calibrated with maximum measured CO concentrations. Several scenarios were analyzed in this analysis including with and without the inspection/maintenance program and with and without the left-turn ban from Douglas to Main Streets. Results indicate attainment in 1985 continuing through 1987 if I/M is maintained.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Mathematical Model Carbon Monoxide Highways Vehicles		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) Unclassified	21. NO. OF PAGES 110
	20. SECURITY CLASS (This page)	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

CONTENTS

		Page
Figures		v
Tables		vi
Acknowledgment		viii
1.	Introduction	1
2.	Ambient CO Concentrations	4
	2.1 Ambient CO levels	4
	2.2 Impact of 1979 CO control strategy	6
	2.3 CO levels at the SPM Site	7
3.	Modeling Methodology	8
	3.1 Overview	8
	3.2 Traffic and street characterization	9
	3.3 CO emission characteriztaion	12
	3.4 Meteorology	16
	3.5 CALINE-3 model	17
	3.6 Urban background concentrations	18
	3.7 Calibration of CALINE-3 results	20
4.	Analysis of the Special Purpose Monitor	22
	4.1 Introduction	22
	4.2 Emission/roadway scenarios	25
	4.3 CO Impact with left turns	30
	4.4 CO Impact with no left turns	35
	4.5 Summary of SPM site CO impacts	41
5.	Calculation of Total CO Exhaust Emissions	45
6.	Conclusions and Recommendations	48
	6.1 Conclusions	48
	6.2 Recommendations	48
References		50

CONTENTS (continued)

		Page
Appendices		
A	Traffic Counts for Main, Douglas Streets	A-1
B	Example Calculations of Idle and Queue Emission Factors	B-1
C	1-Hour Estimated Concentrations of CO at the SPM Site	C-1
D	Mobile-3 Calculations - Main and Douglas Streets	D-1

FIGURES

Number		Page
1	Carbon Monoxide Nonattainment Area and Existing CO Monitors in Wichita, Kansas	2
2	Average Daily Traffic Volumes in 1983 for Streets in the Vicinity of the SPM and WFD No. 2 Monitoring Sites	9
3	Location of SPM Site and Approximate Route of Friday and Saturday Night Street Congestion and Dragging	18
4	Intersection at Main and Douglas in Wichita Showing Traffic Direction and the Location of the Special Purpose Monitor (Including the Left-Hand Turns)	19
5	Queue Link Layout at the Intersection of Main and Douglas Including Left Turns from Douglas to Main	27
6	Through Roadway Link Layout at the Intersection of Main and Douglas (Left Through Link of Link D Is Eliminated for Cases with Left Turn Ban)	29

TABLES

Number		Page
1	Measurements of CO Exceeding the 8-hour NAAQS At the Wichita Special Purpose Monitor	6
2	Seasonal Maximum and Second-Maximum CO Concentrations at the SPM Site	7
3	Growth Factors Derived From KDOT Projected VMT for Wichita, Kansas	11
4	Urban Background Concentrations	19
5	Observed 8-Hour and Calculated 1-Hour CO Concentrations Used for Model Calibration	20
6	Queue Analysis for the Intersection at Main and Douglas	24
7	Through Traffic Characteristics and Carbon Monoxide Emissions With I/M and Left Turns for Main and Douglas Streets	31
8	Queue Traffic Characteristics and Carbon Monoxide Emissions With I/M and Left Turns for Main and Douglas Streets	32
9	Through Traffic Characteristics and Carbon Monoxide Emissions With No I/M but With Left Turns for Main and Douglas Streets	33
10	Queue Traffic Characteristics and Carbon Monoxide Emissions With No I/M but With Left Turns for Main and Douglas Streets	34
11	Maximum Estimated 8-Hour Concentrations of CO at the SPM Site in Wichita, Kansas, Allowing Left-Hand Turns	36
12	Through Traffic Characteristics and Carbon Monoxide Emissions With I/M and No Left Turns for Main and Douglas Streets	37

TABLES (continued)

Number		Page
13	Queue Traffic Characteristics and Carbon Monoxide Emissions With I/M for Main and Douglas Streets and No Left Turns	38
14	Through Traffic Characteristics and Carbon Monoxide Emissions With No I/M and No Left Turns for Main and Douglas Streets	39
15	Queue Traffic Characteristics and Carbon Monoxide Emissions With No I/M for Main and Douglas Streets and No Left Turns	40
16	Maximum Estimated 8-Hour Concentration of CO at the SPM Site in Wichita, Kansas, With No Left-Hand Turns	42
17	Maximum Estimated 8-Hour Concentration of CO at the Special-Purpose Monitor in Wichita, Kansas	43
18	Total VMT/Day by Facility Type	47
19	Annual Average Composite Exhaust CO Emissions Factors by Facility Type	47
20	Average Daily Exhaust CO Emissions in the Nonattainment Area	47
21	Annual Exhaust CO Emissions in the Nonattainment Area	47

ACKNOWLEDGMENT

This report was prepared under the direction of Mr. Robert Chanslor of the Air Branch of Region VII in Kansas City, Missouri. Mr. George Schewe of the PEI office in Cincinnati, Ohio, was the author. Mr. Keith Rosbury of the PEI office in Denver, Colorado, directed the task. Additional assistance was provided by Mr. Joseph Carvitti on the traffic analysis and Messrs. Jeffrey Winget and Joseph Velten in all computer simulations.

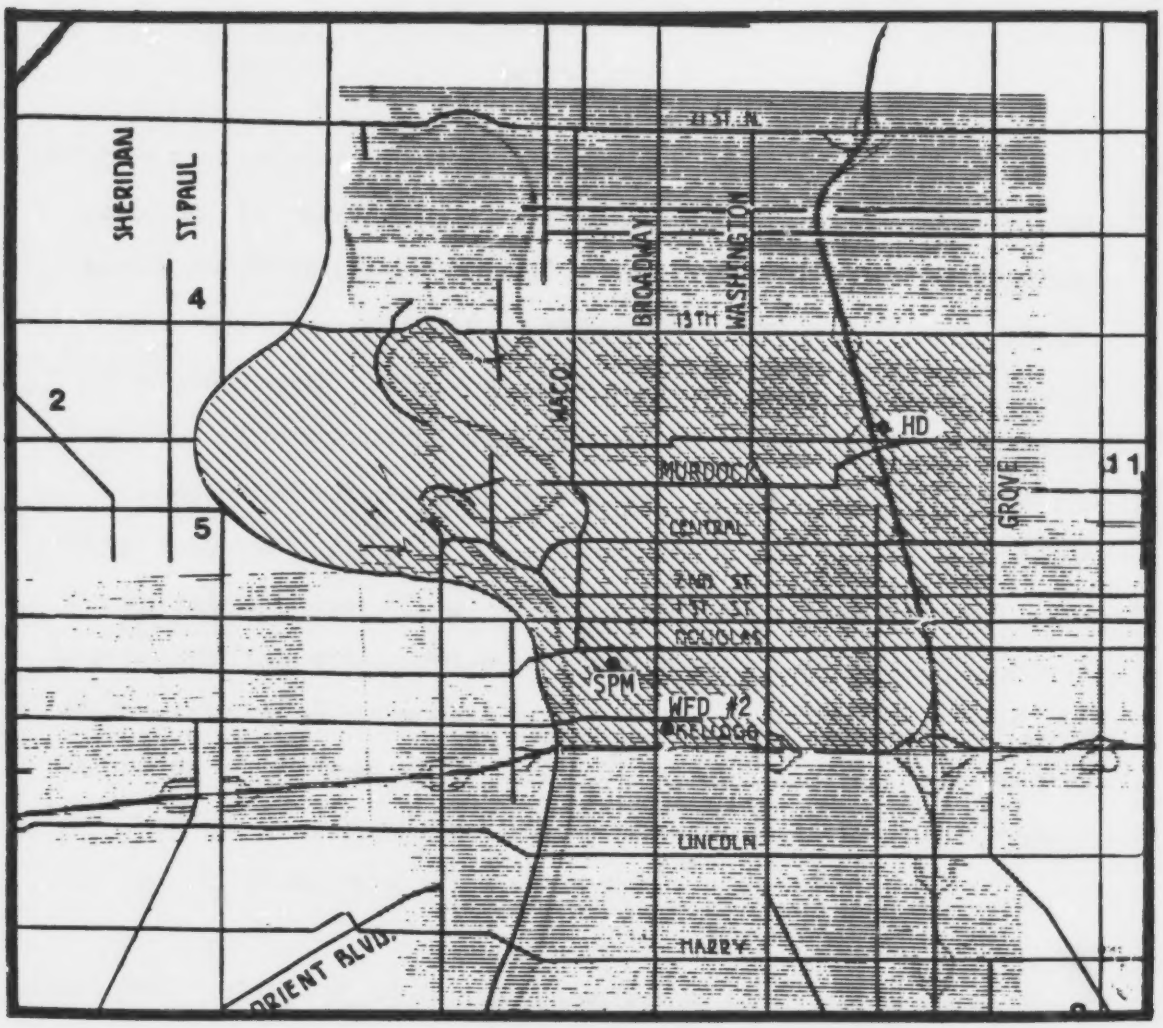
Also appreciated was the assistance of Ms. Joyce Hart of the Wichita Metropolitan Area Planning Department and Messrs. William McKinley and Robert Mielke of the Wichita Department of Operations and Maintenance for the traffic data and information provided for downtown Wichita.

SECTION 1

INTRODUCTION

Two permanent CO monitors are located near the central business district (CBD) of Wichita, Kansas. These monitors showed exceedances of the 8-hour (10-mg/m^3) National Ambient Air Quality Standard (NAAQS) during the period extending from 1974 to 1982. As a result, a fully approved State Implementation Plan for CO was implemented in Wichita. Since 1982, no exceedances have been detected at either of these monitors (the Health Department or Fire Department No. 2). Because of these previous exceedances, however, a portion of Wichita was designated as a nonattainment area for CO (i.e., it failed to meet the NAAQS for CO). The EPA requested that the SIP be reviewed because they believed that CO violations were still occurring at other locations. The nonattainment area was determined on the basis of the three monitors and is bounded by 13th Street on the north, Grove Street on the east, Kellogg on the south, and the Big Arkansas River on the west. Figure 1 shows this CO nonattainment area and the locations of the two permanent CO monitors.

In 1983, an additional CO monitor, a Special-Purpose Monitor (SPM), was installed in the central business district (Figure 1) as a check on the attainment progress of the area. This monitor showed exceedances of the 8-hour NAAQS in 1983, whereas the two permanent monitoring sites did not.



WFD #2: WICHITA FIRE DEPARTMENT NO.2
H.D.: HEALTH DEPARTMENT
SPM : SPECIAL PURPOSE MONITOR

Figure 1. Carbon monoxide nonattainment area and existing CO monitors in Wichita, Kansas.

The SPM site exceedances have all occurred on Friday or Saturday nights when vehicular traffic is heavy as a result of "cruising," primarily by persons of high school and college age.

The Special-Purpose Monitor, which is located at 111 West Douglas Street, has operated continuously since its installation. This monitor meets the general guidelines for the horizontal and vertical placement of a CO probe (40 CFR 58, Appendix E). The following comparison shows the guideline criteria versus the SPM siting:

- Distance from edge of nearest traffic lane

  Guideline - 2m to 10m
  SPM - 3.05m

- Distance from intersection street corridor

  Guideline - minimum of 10m
  SPM - 27.4m

- Vertical placement

  Guideline - 3 ± 0.5m
  SPM - 3.05m

The only notable difference between the actual SPM site and the recommended siting is the distance from the intersection. The guidelines strongly recommend a midblock location of CO monitors in downtown areas rather than near intersections. The SPM site is much closer to the intersection of Main and Douglas Streets than to midblock.

For the area in question to be able to show attainment, the Wichita state implementation plan must be revised to demonstrate that concentrations of CO at the SPM will be less than the NAAQS by 1987. This emissions and modeling analysis allows for any transportation control measures (TCM's) that have already affected traffic flow and/or CO emissions in the nonattainment

area. For example, the future-year analyses consider the impact of the projected Federal Motor Vehicle Control Program on CO emissions. This analysis is not a complete SIP package for Wichita-Sedgewick County, but rather a background modeling analysis that will be included as part of the overall SIP package.

This study models CO impacts to 1987; it includes detailed dispersion modeling, which compares existing monitored CO concentrations with estimated values (model evaluation) and estimates the 1984 to 1987 CO concentrations. The following sections describe the dispersion modeling, emissions estimates, and the resulting CO concentration projections for the SPM site.

SECTION 2

AMBIENT CO CONCENTRATIONS

2.1 AMBIENT CO LEVELS

Concentrations of CO at the SPM site exceeded the 8-hour NAAQS (10 mg/m^3) a total of 10 times in 1983, one time in 1984, and not at all thus far in 1985. Table 1 shows these concentrations and when they occurred. As shown, the noncomplying concentrations were distributed throughout the year and ranged from 10.2 mg/m^3 to 12.2 mg/m^3. The distribution of values is somewhat atypical (e.g., one would expect to find the maximum 8-hour value in one of the winter months, whereas it occurred in August). This distribution indicates that either the meteorological conditions or variations in traffic volumes and patterns (or both) may have offset the normal variation in CO emissions, which are temperature-dependent. Urban background CO concentration (the concentrations against which all dispersion modeling calculations were compared) also may have varied. All averaging periods ended during late night, high downtown traffic density periods on Friday or Saturday.

Examination of attendance records at the nearby Century II Convention Center indicated that events occurred on 8 of the 11 dates with high CO concentrations. The attendance per event ranged from a minimum of 500 persons to 3300 persons, who arrived and departed over a limited time span, i.e., immediately before and after the event. An examination of the 8-hour

periods of high concentrations shows that no single hour of measurements could be associated with attendance at a Century II event and that the concentrations were high over a longer period of time than expected with an influx of traffic for a particular event.

TABLE 1. MEASUREMENTS OF CO EXCEEDING THE 8-HOUR NAAQS AT THE WICHITA SPECIAL PURPOSE MONITOR (1983 to April 1985)

Eight-hour concentration, mg/m^3	Ending day, date	Ending hour
11.0	Sunday, 1-16-83	3 a.m.
10.5	Friday, 3-4-83	12 p.m.
11.1	Friday, 4-15-83	12 p.m.
10.7	Saturday, 7-23-83	1 a.m.
10.8	Sunday, 7-24-83	3 a.m.
12.2	Saturday, 8-6-83	4 a.m.
11.5	Saturday, 9-3-83	3 a.m.
10.2	Saturday, 10-8-83	1 a.m.
11.6	Sunday, 10-16-83	3 a.m.
11.8	Saturday, 10-29-83	1 a.m.
11.0	Sunday, 1-8-84	4 a.m.

Based on the assumption that ambient concentrations are not directly related to Century II activities alone, it was further assumed that nighttime street cruising (observed visually and appearing in street counts) was a primary contributor to the high ambient CO concentrations.

2.2 IMPACT OF 1979 CO CONTROL STRATEGY

In 1979 an SIP for CO was implemented in Wichita. As of May 31, 1984, 11 transportation control measures (TCM's) had been committed.

1. Voluntary I/M
2. Improved traffic flow - Grove Street
3. Improved traffic flow - 1st/2nd Street Bridge
4. Improved traffic flow - 2nd Street
5. Transit - 26 new buses
6. Rideshare program

7. Alternate fuel use in county, city and school vehicles
8. Transit service improvements
9. Signal improvements
10. On-street parking restrictions, Phase I--not implemented
11. On-street parking restrictions, Phase II--not implemented

Since 1982, no exceedances of the CO NAAQS have been detected at the two permanent CO monitoring sites (see Figure 1). This improvement can possibly be attributed to the implementation of the first nine TCM's. Of concern, however, is that the SPM site continued to exceed the 8-hour NAAQS. Of all the TCM's proposed in the SIP, only the voluntary I/M Program will have a significant effect on the late-night cruising phenomena. Other TCM's are primarily effective during peak-hour periods in the morning and afternoon.

2.3 CO LEVELS AT THE SPM SITE

For calibration of the dispersion model for estimating future year CO concentrations, the maximum and second-maximum concentrations for the winter and summer seasons were reviewed (the two extreme seasons which give the best indication of the seasonal variation in CO emissions). Table 2 presents the maximum and second-maximum concentrations (above the NAAQS) for these seasons in 1983 and 1984. The second-maximum values were used in all calibrations of the modeling results in order to satisfy the NAAQS, which allow one exceedance per year. A discussion of the calibration procedures is presented in Section 3.

TABLE 2. SEASONAL MAXIMUM AND SECOND MAXIMUM CO CONCENTRATIONS AT THE SPM SITE

Year	Season[a]	Measured 8-hour concentrations, mg/m^3	
		Maximum	Second maximum
1983	Winter	11.0	8.8
1983	Summer	12.2	10.8
1984	Winter	11.0	8.5

[a]Winter: December, January, and February; summer: June, July, and August.

SECTION 3

MODELING METHODOLOGY

3.1 OVERVIEW

The basic modeling methodology used in this analysis combined the use of Mobile-3[1] emission factors and the CALINE-3[2] highway dispersion model into a microscale analysis. Because the emission factors estimated by MOBILE-3 were given in grams per vehicle (moving) and grams per vehicle-minute (idling), traffic volumes, speeds, queuing lengths, and delay times were also calculated or estimated. Inputs to the MOBILE-3 program include ambient air temperature, the option to include inspection/maintenance, vehicle cold/hot start percentages, year of analysis, vehicle speed, vehicle class mix, and model year distribution within each vehicle class.

Source characterization consisted of dividing nearby roadways and intersections into individual through and queuing links. Because this was primarily a microscale analysis (only the intersection and midblock streets in the immediate vicinity are modeled; all other contributions are considered urban background), the CO concentration estimates reflect small changes in traffic volumes and flow.

Accurate 1-hour and 8-hour dispersion modeling of specific actual events is very difficult given the uncertainty in emissions, source characteristics, vehicle movement, meteorological conditions, and the complex flow of the downwind roadway plumes. Rather than using meteorological data from the

Wichita Airport or using specific hour-by-hour vehicle counts, worst-case meteorological and emission conditions were assumed. The worst-case 1-hour CO concentrations (including urban background) were calibrated to 8-hour estimates by using a ratio of the estimated 1-hour concentration to the measured 8-hour concentrations at the SPM site. The resulting calibration factors were similar to the persistence factor of 0.7 (as recommended by the EPA[3]). This calibration includes implicit meteorological variability and permits comparison of the estimated 1-hour concentration with the 8-hour measured CO concentrations.

3.2 TRAFFIC AND STREET CHARACTERIZATION

The Wichita Department of Operations and Maintenance provided 1983 and 1984 traffic counts and signal cycle timing for the streets and intersections near the SPM site. (The signal and phase timing represents the most up-to-date signalization used in the downtown area.) The 1983 average daily traffic (ADT) counts for the downtown area (shown in Figure 2) indicated that the intersection at Main and Douglas has high traffic volumes on all four legs.

Hourly traffic distributions were taken on July 13-14, 1984, and March 29-31, 1985, at a temporary counter located on Douglas Street (just west of Main Street). These data and those obtained at the permanent traffic counter on Main Street (just south of Douglas) confirmed the high traffic volumes associated with late-night cruising. Traffic counts during the period from 8:00 p.m. to 2:00 a.m. were often greater than 50 to 60 percent of the weekday peak hour (which normally occurs from 5:00 to 6:00 p.m.), and on Saturday the counts were greater than for any individual daytime hour. Appendix A presents the individual hourly traffic count summaries used for the analysis of the streets near the SPM site.

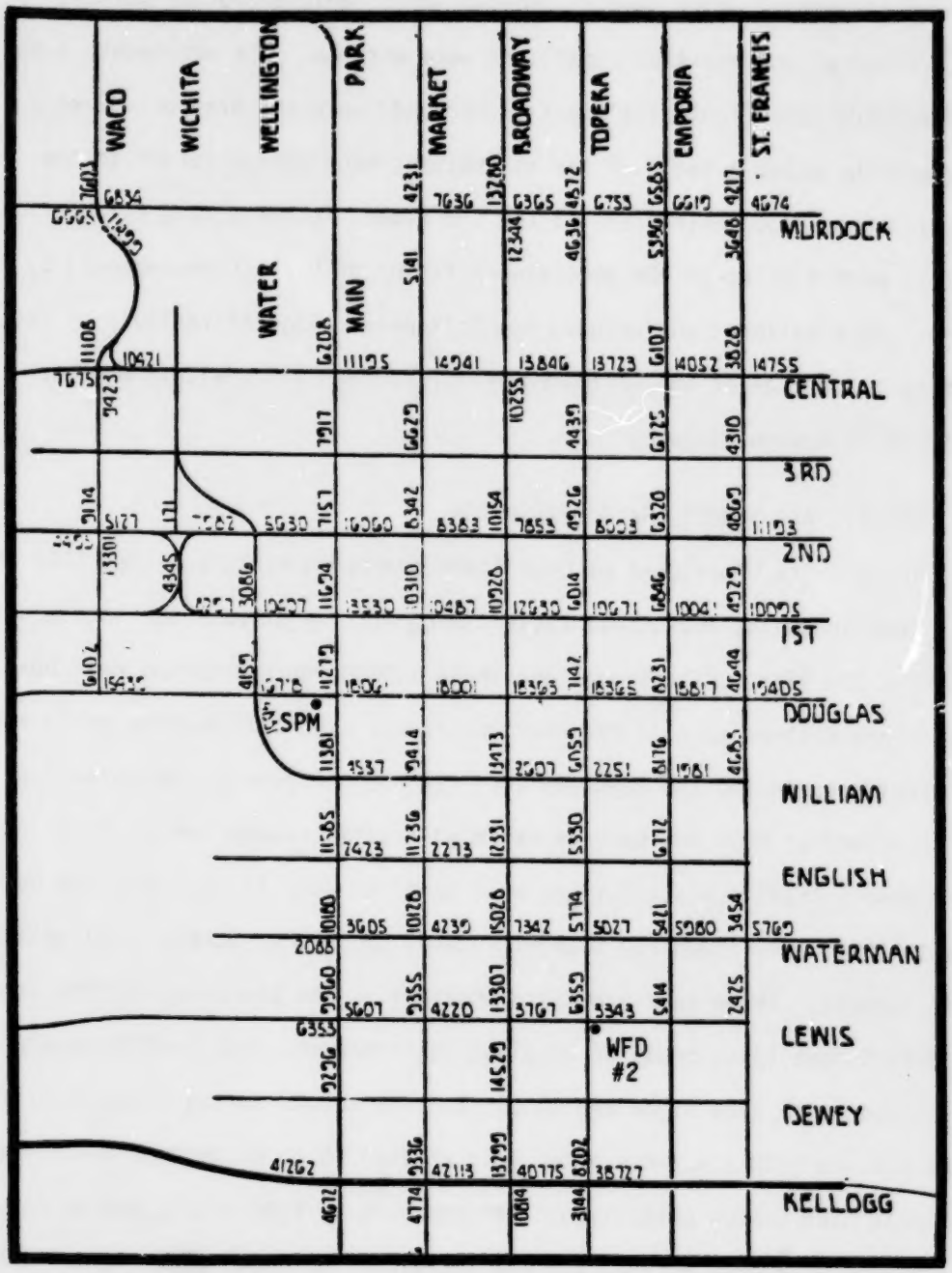


Figure 2. Average daily traffic volumes in 1983 for streets in the vicinity of the SPM and WFD No. 2 monitoirng sites.

The expected growth in vehicle miles traveled (VMT) was used to estimate the traffic volumes for future years on each street. These estimates were made by KDOT[4] using a travel demand model for a dispersion modeling study of Wichita for 1982 and the year 2000. A straight-line estimate of the growth rate from 1983 to 1987 was approximated using the KDOT estimates for vehicle miles traveled in 1982 and 2000. The resulting growth rates for each year are shown in Table 3 with respect to data for 1984. These rates were used to adjust the through-traffic volumes on Douglas and Main Streets. No growth projections were made for queuing traffic volumes (they are calculated for the purpose of estimating total queue emissions). The assumption made throughout this analysis is that the projected vehicular volumes will not exceed street capacities and that queue lengths will not change significantly.

TABLE 3. GROWTH FACTORS DERIVED FROM KDOT PROJECTED VMT FOR WICHITA, KANSAS

Year	Projected number of vehicle miles traveled	Ratio of future year to 1984
1983	5,219,504	0.984
1984[a]	5,302,941	1.000
1985	5,386,379	1.016
1986	5,469,817	1.032
1987	5,553,255	1.047

[a]Base case because traffic data used in analysis is primarily from 1984.

Each leg of the intersection was divided into smaller "links" as appropriate to represent different vehicle movements and speeds. These model links represented vehicle traffic traveling through the intersection at

representative speeds. They also represented vehicle queues where appropriate. If a left-hand turn lane had vehicles left over from a green light cycle, or if differences arose between queuing in different lanes, more links were used to simulate the intersection leg. (Individual links are described in subsequent chapters.)

One special feature that was incorporated into the 1985 analysis of Douglas and Main Streets was the banning of left-hand turns from westbound Douglas to Southbound Main. The effect on the 1985 analysis was to eliminate queue links from consideration and to adjust adjacent links accordingly.

3.3 CO EMISSION CHARACTERIZATION

Emissions from a vehicle traveling through an intersection or street without experiencing delay were calculated directly by MOBILE-3. For queuing vehicles, the idling CO emissions calculated by MOBILE-3 were combined with the approximate vehicle length (4.35 m/veh) to determine the emissions per roadway length per second per lane. This information combined with the number of lanes and the delay time in each queue yields a total emission estimate over the length of the queue. The CALINE-3 model required both an emission rate (g/mi) and a vehicle count. Thus, for queuing links, an arbitrary emission rate of 100 g/mi was assigned; using the total queue emissions, an equivalent vehicle-per-hour count was back-calculated for use in CALINE-3. These rates were calculated in accordance with suggested EPA Region I techniques;[5] details are presented in Appendix B.

The use of the MOBILE-3 emissions model was dependent on a number of factors, each of which is discussed in the following subsections.

3.3.1 Year of Analysis

For this modeling analysis, CO emissions were estimated for the years 1983 through 1987. The 1983 and 1984 estimates were made to correspond with the years of data collected at the SPM site. The purpose of the other year estimates was to estimate the CO emissions (and related ambient air quality impacts) for future years to determine when attainment would be reached under various scenarios.

3.3.2 Route Speeds

Route speeds on Douglas and Main Streets were estimated on the basis of observations[6] and speed limits. Speeds of 10, 15, 20, and 25 miles per hour were estimated for the streets and intersections in the subject analysis. These speeds were used in subsequent MOBILE-3 calculations.

3.3.3 Vehicle Mix

The MOBILE-3 default mix of vehicle types (national mix for all roads) is not applicable for analysis of the SPM site because the site is in an urban area with little heavy truck traffic and the maximum events are associated with the late-night period and the cruising phenomenon. In a previous modeling study,[4] the Kansas Department of Transportation suggested the following vehicle mix for arterial and collector streets:

LDV*	LDT1	LDT2	HDG	LDDV	LDDT	HDD	MC
0.777	0.089	0.089	0.030	0.0	0.0	0.010	0.005

*Glossary of terms

LDV = light-duty gas vehicle
LDT1 = light-duty gas truck, less than 6000 lb
LDT2 = light-duty gas truck, 6001 to 8500 lb
HDG = heavy-duty gas truck
LDDV = light-duty diesel vehicle
LDDT = light-duty diesel truck
HDD = heavy-duty diesel truck
MC = motorcycle

Because heavy-duty vehicles were not observed during cruising periods,[6] these percentages were redistributed to the LDV, LDT, and LDD classes, and the following distribution was used in this analysis for Main and Douglas Streets:

LDV	LDT1	LDT2	HDG	LDDV	LDDT	HDD	MC
0.797	0.094	0.094	0.0	0.01	0.0	0.0	0.005

These distributions were used in the base year (1983) and all subsequent projection year analyses (1984-1987).

3.3.4 Vehicle Registrations

The vehicle age distribution observed[6] during a Friday night cruising period (July 13-14, 1984) appeared to be skewed toward somewhat older vehicles than those in the MOBILE-3 default distribution. To account for the greater number of older automobiles, the national average mix in MOBILE-3 was adjusted for the LDV and LDDV classes. The adjustment involved moving the age of 10 percent of the vehicles back 2 years each year starting with the 1984 year. This resulted in fewer new cars on the downtown Wichita streets during the late-night periods.

3.3.5 Vehicle Mileage Accrual Distributions

Because of the lack of local information, the national averages contained in the MOBILE-3 model were used for vehicle mileage accrual distributions for both the base year and projection year emission calculations.

3.3.6 Ambient Air Temperatures

Temperatures are discussed under meteorological considerations; however, because CO emissions are a direct function of ambient temperature, they are summarized here. Because CO emissions are dependent on temperature, a seasonal and even daily variation in emissions could occur. For this analysis, the winter and summer months were thought to provide representative analysis

periods. Two cases (January and July) were reviewed and analyzed for both the baseline and projection years. In an attempt to correlate the modeled and measured CO concentrations, average temperatures were documented during selected high CO events. Temperatures for each 8-hour period were taken from Local Climatological Data, Wichita, Kansas, 1983. During the 8-hour monitoring period of January 15-16, 1983, the average temperature was 24°F; during the August 5-6, 1983, period (the maximum in 1983), the average temperature was 80°F. These two average temperatures were used in both the baseline and projection year analyses.

3.3.7 Cold Start/Hot Start Percentages

In the absence of local data to support specific cold- and hot-start percentages, the Federal Test Procedure percentages were used, as specified in the MOBILE-3 user manual:

20.6 percent cold start of noncatalyst LDV
27.3 percent hot start of catalyst LDV
20.6 percent cold start of catalyst LDV

These values were used in both the baseline and projection year calculations.

3.3.8 Inspection/Maintenance Credits

The city of Wichita currently conducts a voluntary inspection/maintenance (I/M) program. A total of 81,403 cars were tested from April 1981 to December 1984. Because the program is voluntary, it is difficult to assess the overall pass/fail percentage (i.e., stringency level) within the context of the entire Wichita vehicle fleet. Even though the fail rate in 1983 was 35.4 percent,* only 1954 of the 5513 cars that failed returned for a retest. Of these, 785 failed a second time. The effect of voluntary inspection,

*Wichita TCM Summary, July 13, 1984, in a letter from Robert Eye, Kansas Department of Health and Welfare, to Carl Walker, EPA Region VII.

therefore, was to have 1169 vehicles repaired, which represents a 7.5 percent stringency level in 1983. The lowest stringency level option available in MOBILE-3 is 10 percent, which was selected as representative of Wichita's voluntary program, given the other uncertainties in projecting the I/M program on the overall vehicle fleet.

Only the LDV class was assumed to be affected by I/M. The idling test at the 3 percent CO/300 ppm HC level was assumed to be in effect. These assumptions were used for both the baseline and projection year analyses.

3.4 METEOROLOGY

Inasmuch as event-by-event modeling of specific CO measurements is nearly impossible because of uncertainties in the emissions, traffic, and meteorology at a particular site, a worst-case modeling analysis was performed in order to model the maximum concentrations of CO. Airport meteorological data were not used because they may not be representative of the urban core. No site-specific data were available. In an attempt to simulate worst-case conditions at the SPM site, wind directions were incremented every 10 degrees from west to east. Local meteorological measurements were reviewed to ensure reasonableness in all other data selections. For most of the dates showing high CO concentrations at the SPM, local climatological summaries from the airport and from the Wichita Health Department indicated windspeeds of about 1.5 m/s or greater for all days where the SPM exceeded the 8-hour NAAQS. Only for the August 5-6, 1983, exceedance did windspeeds measure as low as 1 m/s. Thus, a windspeed of 1.5 m/s is used for the January analysis, and 1.0 m/s for the July analysis.

Other conditions included a mixing height of 100 meters (conservative nighttime mixing height) and a neutral atmospheric stability for the urban area.[5]

3.5 CALINE-3 MODEL

The CALINE-3 Model was used to simulate the dispersion of CO emission plumes from vehicles on roadways. Each roadway was broken into through-traffic links and queuing vehicle links as appropriate. The end coordinates and the width of each link were specified in the model. All links near the SPM site were modeled coincidentally to obtain a total roadway impact as well as to ascertain each link's contribution to the total concentration. Traffic volumes of all moving vehicles and MOBILE-3 emission factors were used for each through-link. Volumes and emissions for 1983 were input for the base year, and growth-adjusted volumes and MOBILE-3 projected emissions were specified for 1984 through 1987. Queue-link traffic volumes were adjusted to reflect total idling CO emissions projected by MOBILE-3 for future years.

Deposition and settling velocities were assumed to be negligible because CO is a gaseous emission. An averaging time of 60 minutes was selected. A surface roughness of 321 cm was assigned to the analysis area, which was consistent with the CALINE-3 guidance for surface roughness in a central business district. The coordinates and the vertical displacement of the SPM site were input as appropriate. Meteorological conditions were assigned as discussed in Section 3.4. Background concentrations are discussed in Section 3.6.

Results obtained from the CALINE-3 Model were calculated as 1-hour CO concentrations in parts per million. For calculation of the 1-hour concentrations in mg/m^3, the 1-hour values (in ppm) were divided by a conversion factor of 0.875.

3.6 URBAN BACKGROUND CONCENTRATIONS

Because the SPM site was located in an urban area and because the data described herein were analyzed only for nearby roadways, the background concentration must reflect all other CO concentrations. In this case the background concentration will be called an "urban background." This type of background concentration must include more than the natural background; it must also include the upwind contributions from other CO sources in the area during the same time period.

Examination of the two permanent monitor sites shown in Figure 1 and the average wind directions during high CO concentrations at the SPM site (generally from the south) indicates that the Wichita Fire Department No. 2 (WFD No. 2) CO monitor may be appropriate to serve as an urban background site. This site is near the intersection of Lewis and Topeka, about four blocks south and three blocks east of the SPM site. The WFD No. 2 monitor is far enough from the urban core and from major thoroughfares to prevent it from being subjected to high direct CO impacts from any major roadway. The WFD No. 2 monitor is also generally upwind of the SPM site during high CO periods, and it is situated in an area that is impacted by a major portion of the CO emissions in Wichita.

For this analysis, the CO concentrations at the WFD No. 2 monitor were judged to be the best suited to represent urban background concentrations. The highest concentrations were examined at the WFD No. 2 monitor for the same periods as the maximum 8-hour concentrations at the SPM site. For each of the analysis months (January and July), the WFD No. 2 concentrations were selected on the basis of the highest value for the season (which included any exceedance periods in December, January, and February and June, July, and

August). The 8-hour mg/m³ concentration was converted to a 1-hour ppm value by multiplying by 0.875 (the mg/m³ to ppm conversion) and dividing by 0.7 (the volume 10 recommended 1-hour to 8-hour ratio.[3]).

Table 4 presents the selected WFD No. 2 8-hour CO concentrations and the converted 1-hour counterpart in parts per million for input to the CALINE-3 Model for 1983 through 1987. An estimate of 1984 through 1987 background concentrations of CO were obtained by adjusting the measured 1983 values. The adjustments were made by multiplying by the VMT growth rates for each year and by the approximate future year to 1983 MOBILE-3 emission ratios. At speeds varying from 10 to 25 miles per hour, the ratio varies less than 5 percent; 15 miles per hour was chosen as the representative speed to perform the ratios. Table 4 presents the measured WFD No. 2 concentrations and the derived values for each future year. A composite MOBILE-3 ratio was derived by combining the CO emission factor ratios for each ambient temperature (January: 24°F and July: 80°F) and for both an I/M and no I/M case.

TABLE 4. URBAN BACKGROUND CONCENTRATIONS

Month of analysis	Measured 8-hour concentration, mg/m³	Derived 1983 1-hour background concentration, ppm	Projected 1-hour urban background concentration, ppm			
			1984	1985	1986	1987
January	2.6[a]	3.3	3.2	3.0	2.8	2.7
July	1.2[b]	1.5	1.4	1.3	1.3	1.2

[a]Measured on 1/16/83.
[b]Measured on 8/6/83.

3.7 CALIBRATION OF CALINE-3 RESULTS

To estimate future-year concentrations of CO at the SPM site and to make practical recommendations as to the attainment/nonattainment status of the area, measured and calculated values were compared. This evaluation provided a method of allowing the 1983 and 1984 maximum CO concentrations to be compared with the measured values at the SPM site and the CALINE-3 estimates. Table 5 presents the seasonal maximum and second-maximum CO concentrations measured at the SPM site in 1983 and 1984 (only for the seasons and years showing a maximum concentration above the 8-hour NAAQS and that are part of this analysis, i.e., winter and summer).

TABLE 5. OBSERVED 8-HOUR AND CALCULATED 1-HOUR CO CONCENTRATIONS USED FOR MODEL CALIBRATION

Season	Year	Measured 8-hour CO concentration,[a] mg/m³		Estimated 1-hour CO maximum concentration,[a] mg/m³	Ratio of 8-hour to 1-hour concentration	
		Maximum	Second-maximum		Maximum	Second-maximum
Summer	1983	12.2	10.8	13.1	0.93	0.82
Winter	1983	11.0	8.8	13.4	0.82	0.66
Winter	1984	11.0	8.5	11.5	0.96	0.74

[a]Includes background.

The ratios for the maximum 8-hour concentrations ranged from 0.82 to 0.96. These ratios were deemed inappropriate for calibration for two reasons. The Volume 10^3 calculations recommend a 1-hour to 8-hour conversion of 0.7 ± 0.2. The ratios for the maximum concentrations in Table 5 were not in this range in two cases. Also, if the maximum concentrations are used for calibration, all future-year estimates are likely to be equivalent to the

maximum for each future year. Under the current NAAQS, one exceedance is allowed per year. Thus, the use of maximum concentrations may not be appropriate for calibration.

Use of the second-maximum concentrations and the derived ratios to the modeled 1-hour estimates was deemed representative for this analysis. The average of the two winter 1983 and 1984 ratios was used as the January calibration (e.g., (0.66 + 0.72)/2 = 0.70). The 0.82 ratio in the summer of 1983 was used to adjust all estimates made for July. All estimates of CO for the various scenarios in Section 4, which are referred to as 8-hour calibrated values, are derived from the 1-hour CALINE-3 estimates adjusted for the observed 8-hour to modeled 1-hour ratios in Table 5.

SECTION 4

ANALYSIS OF THE SPECIAL PURPOSE MONITOR

4.1 INTRODUCTION

The special purpose monitor is located at 111 West Douglas Street, near the intersection of Main and Douglas Streets (see Figure 3). The approximate route of the late Friday and Saturday night cruising prior to January 1985 is also shown in this figure. Traffic moves in both directions on Douglas Street. The loop for the return trips from the west proceeded south on Main and around Century II Drive or north on Water, east on 1st, and south on Main. The east return loop was made by going south on St. Francis, west on William, and north on Emporia. In January 1985, a left-turn ban from westbound Douglas to southbound Main was enacted. The effect of this ban was to eliminate those vehicles remaining in the queue for left turns and thereby reduce the CO impact from these links.

Onsite observations[6] indicated heavy congestion in both directions on Douglas Street. The heaviest congestion was in the center lanes next to the median. Of primary concern in this analysis was the impact of the intersection at Main and Douglas on the SPM site. With this in mind, queuing vehicles were also observed during this period. Table 6 presents the resulting queue analysis for each leg of the intersection at Main and Douglas Streets. This table also shows the number of vehicles selected for this analysis as being representative of each queue and the estimated queue length for each lane (using 4.35 m per vehicle).

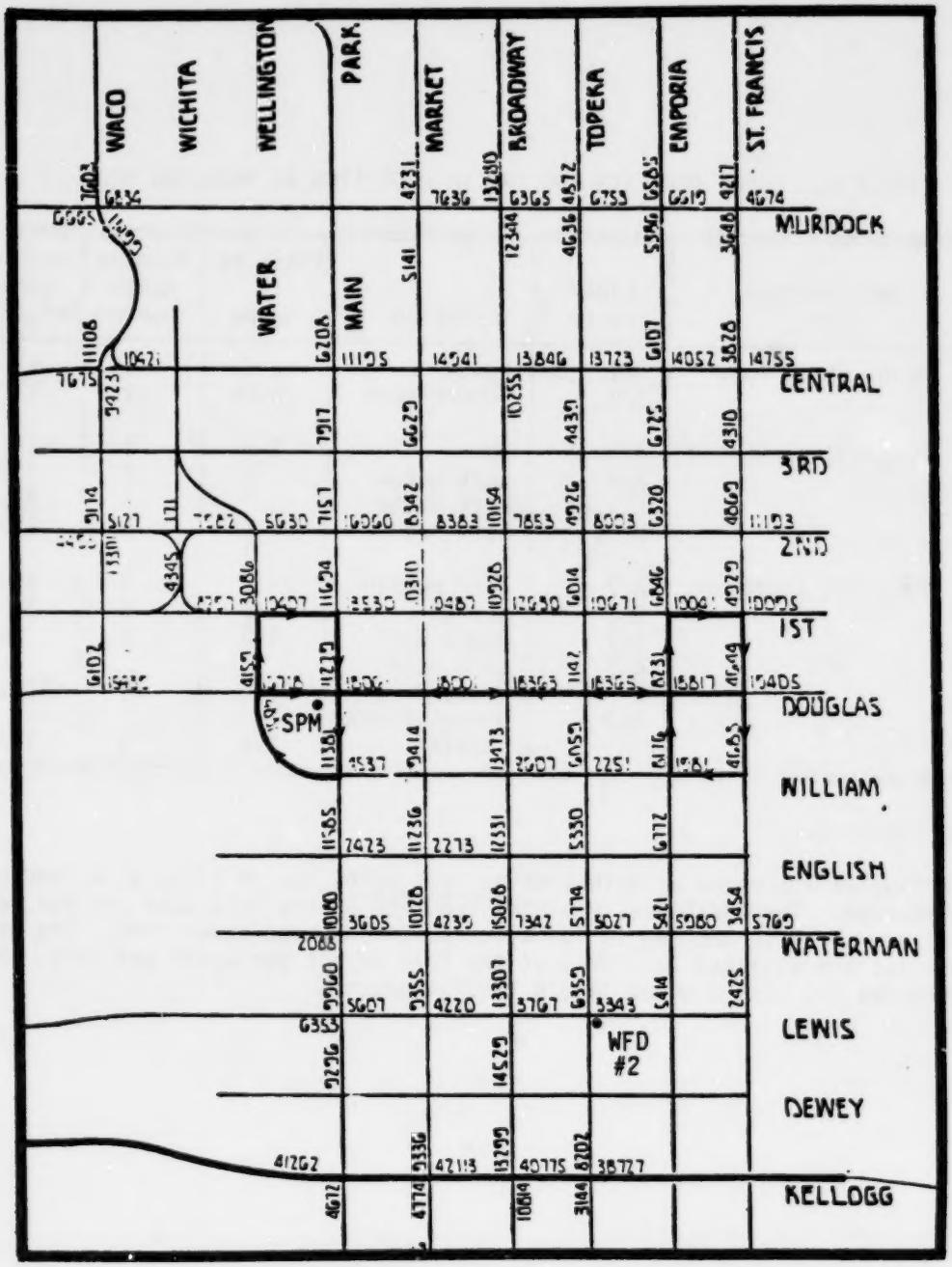


Figure 3. Location of SPM site and approximate route of Friday and Saturday night street congestion and dragging.

TABLE 6. QUEUE ANALYSIS FOR THE INTERSECTION AT MAIN AND DOUGLAS

Intersection leg	Link/ lane No.[a]	Location	Vehicles in queue	Modeled queue number	Modeled queue length, m
Main, southbound	H/1,2,3	West	1-5	3	13.1
	I/4	1-Left turn	10-15	12	52.2
Douglas, westbound[b]	J/2a,3	West	1-5	3	13.1
	K/1	Left queue	5	5	21.8
	L/1,2a	Left queue	5	5	21.8
	M/2b	Left queue	3-5	5	21.8
Douglas, eastbound	N/3	Near median	8-10	9	39.2
	O/2	Center	6-8	7	30.5
	P/1	Right turn	1-3	2	8.7
	Q/5	East near median	30-40	38	165.0
	R/3	Residual near median	2-4	3	13.1

[a]See Figure 5.

[b]For Douglas westbound at Main with no left turns, queue links K, L, and M are eliminated. The additional vehicles from the banned left turn are assumed to clear the intersection in the allotted 34.8-second green time. The extra vehicles are assigned to Link J at the rate of one per cycle per lane, which increases the Link J queue length to 17.4 meters.

4.2 EMISSION/ROADWAY SCENARIOS

The intersection at Main and Douglas was modeled to estimate the impact of CO emissions on the Special Purpose Monitor. For this analysis, the intersection was modeled for two I/M scenarios and two left-hand turn scenarios (Douglas to Main) for the years 1983 to 1987. Some of the combinations of these scenarios do not apply to 1983 or 1984 (such as no I/M and left-hand turn ban), but all scenarios for all years are shown for comparison.

The scenarios modeled for I/M and left turns and the years for which they apply include:

- I/M with left turns; 1983-1984.
- I/M with no left turns; 1985
- No I/M with left turns
- No I/M with no left turns

All cases are possible scenarios for 1986 and 1987 and are modeled to determine the differences and to allow the recommendation of possible alternatives for meeting the NAAQS.

Figure 4 shows the roadway configuration and the location of the SPM. Each leg of the intersection was broken into through vehicle and queue vehicle roadway links. Queuing vehicles were represented by short links equal in length to those described in Table 6. In cases where vehicles moved from one queue into a subsequent queue (i.e., were delayed more than one total signal cycle), additional end-to-end links were constructed. These queue links are shown along with the east-west (x) and north-south (y) coordinates in Figure 5, where the center of the intersection is considered to be the center of the coordinate system (0,0) and all units are in meters. Queue links K, L, and M are eliminated from analysis when the left-turn ban is considered.

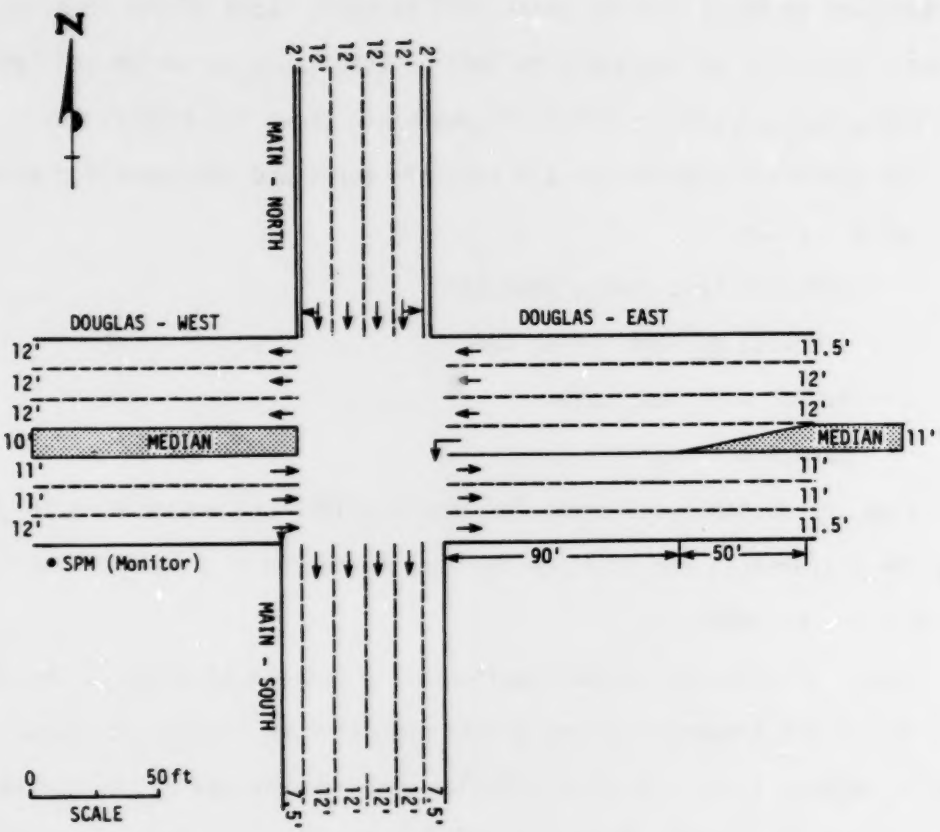
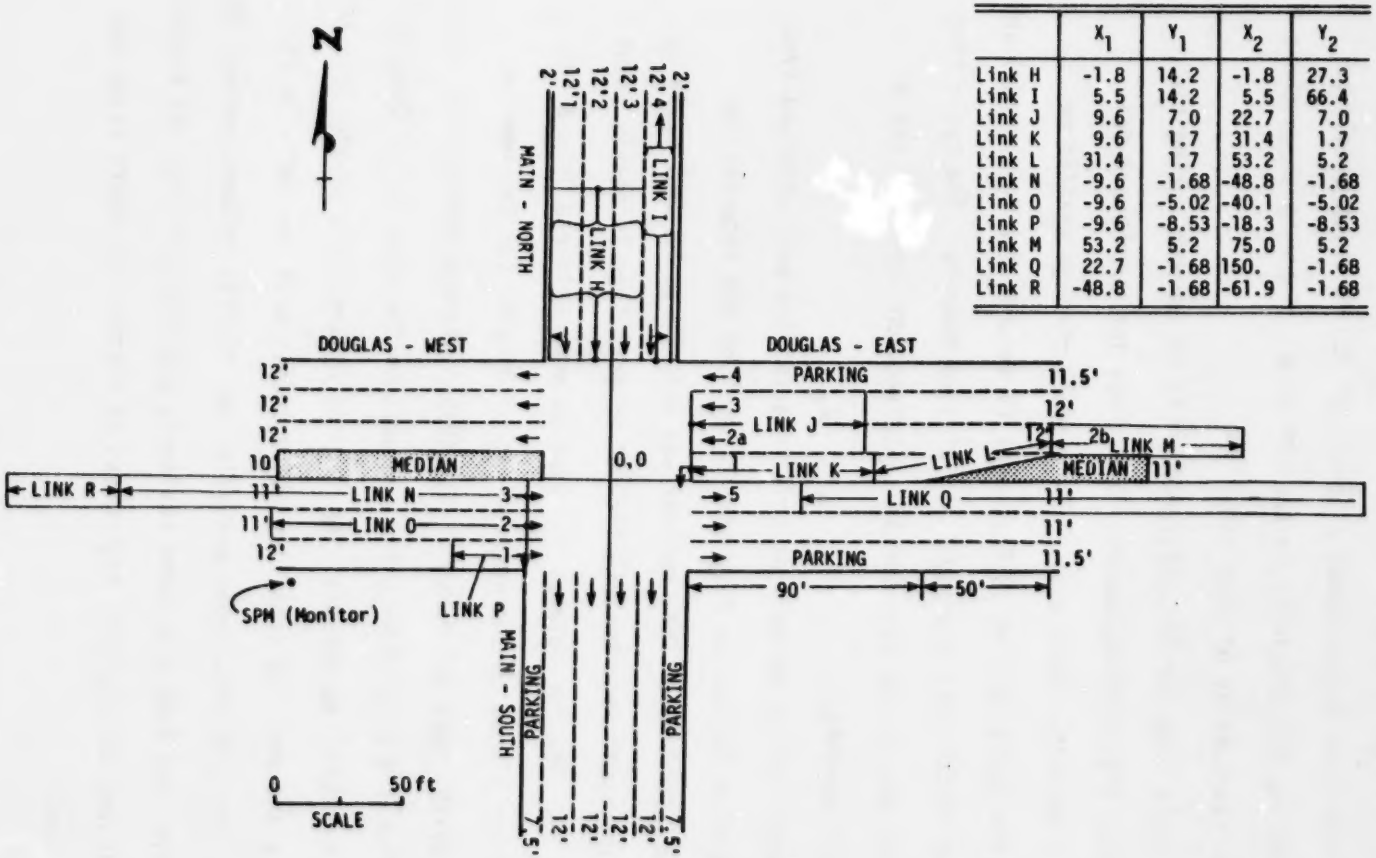


Figure 4. Intersection at Main and Douglas in Wichita showing traffic direction (including the left-hand turns) and the location of the Special Purpose Monitor.



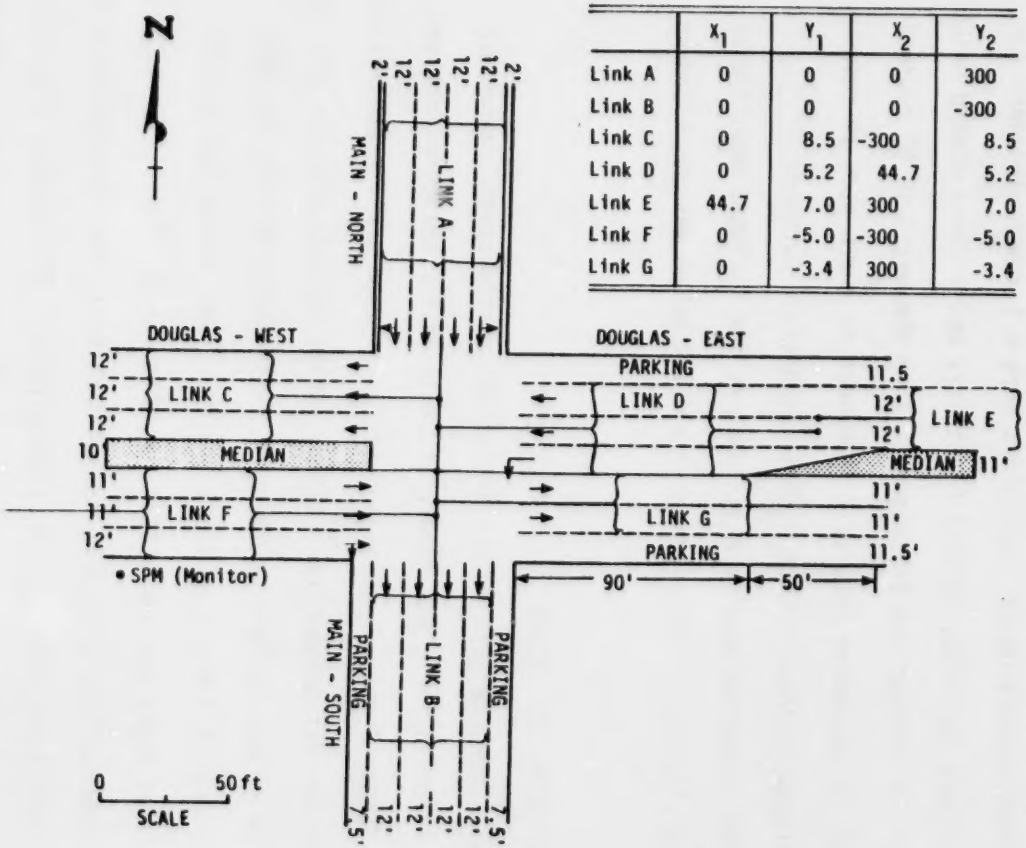
	X_1	Y_1	X_2	Y_2
Link H	-1.8	14.2	-1.8	27.3
Link I	5.5	14.2	5.5	66.4
Link J	9.6	7.0	22.7	7.0
Link K	9.6	1.7	31.4	1.7
Link L	31.4	1.7	53.2	5.2
Link N	-9.6	-1.68	-48.8	-1.68
Link O	-9.6	-5.02	-40.1	-5.02
Link P	-9.6	-8.53	-18.3	-8.53
Link M	53.2	5.2	75.0	5.2
Link Q	22.7	-1.68	150.	-1.68
Link R	-48.8	-1.68	-61.9	-1.68

Figure 5. Queue link layout at the intersection of Main and Douglas including left-turns from Douglas to Main.

In a like manner, the through traffic was characterized by links extending into the intersection and assigned a length of 300 m, which should be sufficient considering the proximity to the SPM site. Figure 6 shows these links and the end coordinates of each link.

The signal cycle time for the intersection is 60 seconds during the off-peak hours when the cruising occurs. The green for southbound Main Street lasts 25.2 seconds. Westbound left-turn and through traffic on Douglas has a green light lasting 34.8 seconds (9 seconds for left turns) and eastbound Douglas traffic has a green light of 25.8 seconds. The cycle time with the left-turn ban is the same for all intersection legs with the 9-second left signal covered.

Vehicle counts for the streets at this intersection were obtained from the permanent monitor located on Main Street south of the intersection (Station No. 5-630-9000-70). This monitor was assumed to be applicable to both the north and south legs because the ADT on both legs is nearly identical (see Figure 2). Traffic volumes for Douglas were obtained from a temporary hose counter placed on the western leg of Douglas for two weekend periods: July 13-15, 1984 and March 29-31, 1985. Average derived ADT values were obtained from the City of Wichita. Volumes on the east leg of Douglas were estimated by adjusting the east leg volumes by the ratio of the 1983 ADT for the east leg and west leg (east leg ADT = 18061; west leg ADT = 16,718; ratio = 1.08). For this worst-case analysis, the traffic volumes between the hours of 8:00 p.m. and 4:00 a.m. were reviewed, and the hour with the highest traffic was selected for analysis regardless of whether the hours coincided on the various links.



	X_1	Y_1	X_2	Y_2
Link A	0	0	0	300
Link B	0	0	0	-300
Link C	0	8.5	-300	8.5
Link D	0	5.2	44.7	5.2
Link E	44.7	7.0	300	7.0
Link F	0	-5.0	-300	-5.0
Link G	0	-3.4	300	-3.4

Figure 6. Through roadway link layout at the intersection of Main and Douglas (left through link of Link D is eliminated for cases with left turn ban).

Each link was characterized according to EPA Region I Mobile Source Modeling Procedures,[5] which include the queuing link analysis as outlined here and in Section 3.3 for idle emission consideration. (See Appendix B for an example calculation.)

The selected meteorological conditions were a 1.5 m/s windspeed for January and 1.0 m/s for July, neutral stability, and a 100-m mixing height. Wind direction was varied from 270 degrees (from the west) to 90 degrees (from the east) in 10-degree intervals from west to north back to east. Section 3.4 discusses these meteorological conditions further.

Background concentrations were assigned to the CALINE-3 modeling as described in Section 3.6. Calibration of all estimates was described in Section 3.7.

4.3 CO IMPACT WITH LEFT TURNS

Individual link characteristics including vehicle speed, number of lanes, CO emission factors, and number of vehicles for through-links are presented in Tables 7 through 10 along with delay time and the equivalent number of vehicles for queue-links. These tables include data on left turns from Douglas westbound to Main southbound. Estimates are made for 1983 through 1987 for both I/M and no I/M scenarios (even though the no I/M scenario does not apply for 1983, 1984, or thus far in 1985). The tables are arranged by through-links with I/M, queue-links with I/M, through-links with no I/M, and queue-links with no I/M, respectively. All factors discussed in Sections 2 and 3 were included in the estimates shown in Tables 7 through 10.

The CO concentration estimates for each meteorological condition for each season and year of analysis are shown in Tables C-1 through C-4 in Appendix C. Tables C-1 and C-3 present 1-hour CO values for all links

TABLE 7. THROUGH TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH I/M AND LEFT TURNS[a] FOR MAIN AND DOUGLAS STREETS

Link	Though-link identification	Vehicle speed, mph	Number of lanes	Year	January (24°F)		July (80°F)	
					CO emission factor, g/mile	Traffic volume, vph	CO emission factor, g/mile	Traffic volume, vph
A	Main N-SB	25	4	1983	49.68	665	28.69	665
				1984	44.98	675	25.03	675
				1985	41.60	686	22.31	686
				1986	38.88	696	20.10	696
				1987	36.49	707	18.16	707
B	Main S-SB	25	4	1983	49.68	670	28.69	670
				1984	44.98	681	25.03	681
				1985	41.60	692	22.31	692
				1986	38.88	702	20.10	702
				1987	36.49	713	18.16	713
C	Douglas W-WB	20	3	1983	62.17	666	35.83	666
				1984	56.45	677	31.36	677
				1985	52.29	687	28.02	687
				1986	48.93	697	25.30	697
				1987	45.97	708	22.91	708
D	Douglas E-WB3 (left turn included)	10	3	1983	112.75	719	66.03	719
				1984	101.04	731	57.23	731
				1985	92.34	742	50.57	742
				1986	85.27	753	45.15	753
				1987	79.13	765	40.40	765
E	Douglas E-WB2	10	2	1983	112.75	719	66.03	719
				1984	101.04	731	57.23	731
				1985	92.34	742	50.57	742
				1986	85.27	753	45.15	753
				1987	79.13	765	40.40	765
F	Douglas W-EB	15	3	1983	79.92	595	46.18	595
				1984	72.47	605	40.41	605
				1985	67.00	614	36.06	614
				1986	62.57	623	32.52	623
				1987	58.68	633	29.40	633
G	Douglas E-EB	10	2	1983	112.75	642	66.03	642
				1984	101.04	653	57.23	653
				1985	92.34	663	50.57	663
				1986	85.27	673	45.15	673
				1987	79.13	684	40.40	684

[a]Douglas Westbound to Main.

TABLE 8. QUEUE TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH I/M AND LEFT TURNS FOR MAIN AND DOUGLAS STREETS

Link	Queue link identification	Number of lanes	Delay time[a]		Equivalent number of vehicles per hour[b]				
					Year of analysis				
			Seconds	Percent	1983	1984	1985	1986	1987
H	Main N, L1-3	3	34.8	0.58	2874	2356	2047	1827	1642
I	Main N, L4	1	34.8	0.58	958	785	682	609	547
J	Douglas E, L1a-3	2	25.2	0.42	1387	1137	988	882	792
K	Douglas E, Left 1	1	51.0	0.85	1404	1151	1000	892	802
L	Douglas E, Left 1-2b	1	60.0	1.00	1652	1354	1177	1050	943
M	Douglas E, Left 2b	1	60.0	1.00	1652	1354	1177	1050	943
N	Douglas W, L3	1	34.2	0.57	941	772	671	598	538
O	Douglas W, L2	1	34.2	0.57	941	772	671	598	538
P	Douglas W, L1	1	34.2	0.57	941	772	671	598	538
Q	Douglas E, L5	1	60.0	1.00	1652	1354	1177	1050	943
R	Douglas W, L3 Ext.	1	60.0	1.00	1652	1354	1177	1050	943

[a]Delay time equals the red time at the intersection of Main and Douglas Streets. The percent delay time is the red time total cycle time ratio. Delay on Links L, Q, and R are 100 percent because these vehicles may be in these queue links more than a full signal cycle.

[b]See Appendix B for example calculation; the CO emission factor equals 100 g/mi (input to CALINE-3). The emission rates in micrograms per meter per second per lane are found in Table B-1.

TABLE 9. THROUGH TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH NO I/M BUT WITH LEFT TURNS[a] FOR MAIN AND DOUGLAS STREETS

Link	Though-link identification	Vehicle speed, mph	Number of lanes	Year	January (24°F)		July (80°F)	
					CO emission factor, g/mile	Traffic volume, vph	CO emission factor, g/mile	Traffic volume, vph
A	Main N-SB	25	4	1983	56.53	665	32.74	665
				1984	53.38	675	29.96	675
				1985	50.47	686	27.40	686
				1986	47.86	696	25.13	696
				1987	45.55	707	23.07	707
B	Main S-SB	25	4	1983	56.53	670	32.74	670
				1984	53.38	681	29.96	681
				1985	50.47	692	27.40	692
				1986	47.86	702	25.13	702
				1987	45.55	713	23.07	713
C	Douglas W-WB	20	3	1983	70.76	666	40.89	666
				1984	66.99	677	37.54	677
				1985	63.43	687	34.41	687
				1986	60.21	697	31.61	697
				1987	57.34	708	29.07	708
D	Douglas E-WB3 (left turn includes)	10	3	1983	128.52	719	75.48	719
				1984	120.26	731	68.67	731
				1985	112.32	742	62.24	742
				1986	105.15	753	56.47	753
				1987	98.81	765	51.29	765
E	Douglas E-WB2	10	2	1983	128.52	719	75.48	719
				1984	120.26	731	68.67	731
				1985	112.32	742	62.24	742
				1986	105.15	753	56.47	753
				1987	98.81	765	51.29	765
F	Douglas W-EB	15	3	1983	90.99	595	52.74	595
				1984	86.05	605	48.39	605
				1985	81.31	614	44.30	614
				1986	77.00	623	40.62	623
				1987	73.17	633	37.30	633
G	Douglas E-EB	10	2	1983	128.52	642	75.48	642
				1984	120.26	653	68.67	653
				1985	112.32	663	62.24	663
				1986	105.15	673	56.47	673
				1987	98.81	684	51.29	684

[a]Douglas Westbound to Main.

TABLE 10. QUEUE TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH NO I/M BUT WITH LEFT TURNS FOR MAIN AND DOUGLAS STREETS

Link	Queue link identification	Number of lanes	Delay time[a]		Equivalent number[b] of vehicles per hour				
					Year of analysis				
			Seconds	Percent	1983	1984	1985	1986	1987
H	Main N, L1-3	3	34.8	0.58	3909	3619	3357	3121	2920
I	Main N, L4	1	34.8	0.58	1303	1206	1119	1040	973
J	Douglas E, L2a-3	2	25.2	0.42	1887	1747	1620	1507	1410
K	Douglas E, Left 1	1	51.0	0.85	1909	1768	1640	1525	1426
L	Douglas E, Left 2b	1	60.0	1.00	2246	2080	1929	1794	1678
M	Douglas E, Left 2b	1	60.0	1.00	2246	2080	1929	1794	1678
N	Douglas W, L3	1	34.2	0.57	1280	1186	1100	1022	957
O	Douglas W, L2	1	34.2	0.57	1280	1186	1100	1022	957
P	Douglas E, L5	1	60.0	1.00	2246	2080	1929	1794	1678
Q	Douglas, W, L1	1	34.2	0.57	1280	1186	1100	1022	957
R	Douglas W, L3 Ext.	1	60.0	1.00	2246	2080	1929	1794	1678

[a]Delay time equals the red time at the intersection of Main and Douglas Streets. The percent delay time is the red time total cycle time ratio. Delay on Links L, Q, and R are 100 percent because these vehicles may be in these queue links more than a full signal cycle.

[b]See Appendix B for example calculation; the CO emission factor equals 100 g/mi (input to CALINE-3). The emission rates in micrograms per meter per second per lane are found in Table B-1.

combined. As shown in these two tables, the maximum concentration typically occurs in January of each year with winds from the east northeast (wind direction 60-80 degrees). Tables C-2 and C-4 present individual link contributions to the maximum study period concentration. Through-links F and G and queue-links K,N,O,P, and Q contribute the greatest percentages to the total. These links tend to be located nearest the SPM site and upwind for the critical wind directions.

The maximum calibrated 8-hour CO concentration of 10.8 $\mu g/m^3$ for I/M and left turns occurred in July 1983. All other years for this case were less than the 8-hour NAAQS of 10 mg/m^3. With no I/M but including left turns, the maximum 8-hour concentration was estimated in July 1983 at 13.6 mg/m^3. Although this case did not actually occur, it provides a comparison to the case with I/M and for future years. Table 11 presents the 8-hour values for the cases with left turns allowed.

4.4 CO IMPACT WITH NO LEFT TURNS

Individual link characteristics including vehicle speed, number of lanes, CO emission factors, and number of vehicles for through-links are presented in Tables 12 through 15 along with delay time and the equivalent number of vehicles for queue-links for the case of no left turns from Douglas westbound to Main southbound. Estimates are made for 1983 through 1987 for both I/M and no I/M scenarios (even though the I/M scenario only applies to the first part of 1985). The tables are arranged by through-links with I/M, queue-links with I/M, through-links with no I/M, and queue-links with no I/M, respectively.

TABLE 11. MAXIMUM ESTIMATED 8-HOUR CONCENTRATIONS OF CO AT THE SPM SITE IN WICHITA, KANSAS, ALLOWING LEFT-HAND TURNS (mg/m^3)

Year	Month	I/M, left turns	No I/M, left turns
1983	January	9.4	11.2
1984	January	8.1	10.6
1985	January	7.4	10.0
1986	January	6.9	9.2
1987	January	6.5	8.9
1983	July	10.8	13.6
1984	July	9.0	12.5
1985	July	8.1	11.6
1986	July	7.4	11.0
1987	July	6.6	10.3

TABLE 12. THROUGH TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH I/M AND NO LEFT TURNS FOR MAIN AND DOUGLAS STREETS

Link	Though-link identification	Vehicle speed, mph	Number of lanes	Year	January (24°F)		July (80°F)	
					CO emission factor, g/mile	Traffic volume, vph	CO emission factor, g/mile	Traffic volume, vph
A	Main N-SB	25	4	1983	49.68	719	28.69	719
				1984	44.98	730	25.03	730
				1985	41.60	741	22.31	741
				1986	38.88	753	20.10	753
				1987	36.49	764	18.16	764
B	Main S-SB	25	4	1983	49.68	670	28.69	670
				1984	44.98	681	25.03	681
				1985	41.60	692	22.31	692
				1986	38.88	702	20.10	702
				1987	36.49	713	18.16	713
C	Douglas W-WB	20	3	1983	62.17	719	35.83	719
				1984	56.45	731	31.36	731
				1985	52.29	742	28.02	742
				1986	48.93	753	25.30	753
				1987	45.97	765	22.91	765
D	Douglas E-WB2	10	2	1983	112.75	719	66.03	719
				1984	101.04	731	57.23	731
				1985	92.34	742	50.57	742
				1986	85.27	753	45.15	753
				1987	79.13	765	40.40	765
E	Douglas E-WB2	10	2	1983	112.75	719	66.03	719
				1984	101.04	731	57.23	731
				1985	92.34	742	50.57	742
				1986	85.27	753	45.15	753
				1987	79.13	765	40.40	765
F	Douglas W-EB	15	3	1983	79.92	595	46.18	595
				1984	72.47	605	40.41	605
				1985	67.00	614	36.06	614
				1986	62.57	623	32.52	623
				1987	58.68	633	29.40	633
G	Douglas E-EB	10	2	1983	112.75	642	66.03	642
				1984	101.04	653	57.23	653
				1985	92.34	663	50.57	663
				1986	85.27	673	45.15	673
				1987	79.13	684	40.40	684

TABLE 13. QUEUE TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH I/M FOR MAIN AND DOUGLAS STREETS AND NO LEFT TURNS

Link	Queue link identification	Number of lanes	Delay time[a]		Equivalent number of vehicles per hour[b]				
					Year of analysis				
			Seconds	Percent	1983	1984	1985	1986	1987
H	Main N, L1-3	3	34.8	0.58	2874	2356	2047	1827	1642
I	Main N, L4	1	34.8	0.58	958	785	682	609	547
J	Douglas E, L2a-3	2	25.2	0.42	1387	1137	988	882	792
N	Douglas W, L3	1	34.2	0.57	941	772	671	598	538
O	Douglas W, L2	1	34.2	0.57	941	772	671	598	538
P	Douglas W, L1	1	34.2	0.57	941	772	671	598	538
Q	Douglas E, L5	1	60.0	1.00	1652	1354	1177	1050	943
R	Douglas W, L3 Ext.	1	60.0	1.00	1652	1354	1177	1050	943

[a]Delay time equals the red time at the intersection of Main and Douglas Streets. The percent delay time is the red time total cycle time ratio. Delay on Links L, Q, and R are 100 percent because these vehicles may be in these queue links more than a full signal cycle.

[b]See Appendix B for example calculation; the CO emission factor equals 100 g/mi (input to CALINE-3). The emission rates in micrograms per meter per second per lane are found in Table B-1.

TABLE 14. THROUGH TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH NO I/M AND NO LEFT TURNS FOR MAIN AND DOUGLAS STREETS

Link	Though-link identification	Vehicle speed, mph	Number of lanes	Year	January (24°F)		July (80°F)	
					CO emission factor, g/mile	Traffic volume, vph	CO emission factor, g/mile	Traffic volume, vph
A	Main N-SB	25	4	1983	56.53	719	32.74	719
				1984	53.38	730	29.96	730
				1985	50.47	741	27.40	741
				1986	47.86	753	25.13	753
				1987	45.55	764	23.07	764
B	Main S-SB	25	4	1983	56.53	670	32.74	670
				1984	53.38	681	29.96	681
				1985	50.47	692	27.40	692
				1986	47.86	702	25.13	702
				1987	45.55	713	23.07	713
C	Douglas W-WB	10	3	1983	70.76	719	40.89	719
				1984	66.99	731	37.54	731
				1985	63.43	742	34.41	742
				1986	60.21	753	31.61	753
				1987	57.34	765	29.07	765
D	Douglas E-WB2 (left turn included)	10	2	1983	128.52	719	75.48	719
				1984	120.26	731	68.67	731
				1985	112.32	742	62.24	742
				1986	105.15	753	56.47	753
				1987	98.81	765	51.29	765
E	Douglas E-WB2	10	2	1983	128.52	719	75.48	719
				1984	120.26	731	68.67	731
				1985	112.32	742	62.24	742
				1986	105.15	753	56.47	753
				1987	98.81	765	51.29	765
F	Douglas W-EB	15	3	1983	90.99	595	52.74	595
				1984	86.05	605	48.39	605
				1985	81.31	614	44.30	614
				1986	77.00	623	40.62	623
				1987	73.17	633	37.30	633
G	Douglas E-EB	10	2	1983	128.52	642	75.48	642
				1984	120.26	653	68.67	653
				1985	112.32	663	62.24	663
				1986	105.15	673	56.47	673
				1987	98.81	684	51.29	684

TABLE 15. QUEUE TRAFFIC CHARACTERISTICS AND CARBON MONOXIDE EMISSIONS WITH NO I/M FOR MAIN AND DOUGLAS STREETS AND NO LEFT TURNS

Link	Queue link identification	Number of lanes	Delay time[a]		Equivalent number of vehicles per hour[b]				
					Year of analysis				
			Seconds	Percent	1983	1984	1985	1986	1987
H	Main N, L1-3	3	34.8	0.58	3909	3619	3357	3121	2920
I	Main N, L4	1	34.8	0.58	1303	1206	1119	1040	973
J	Douglas E, L2a-3	2	25.2	0.42	1887	1747	1620	1507	1410
N	Douglas W, L3	1	34.2	0.57	1280	1186	1100	1022	957
O	Douglas W, L2	1	34.2	0.57	1280	1186	1100	1022	957
P	Douglas W, L1	1	34.2	0.57	1280	1186	1100	1022	957
Q	Douglas E, L5	1	60.0	1.00	2246	2080	1929	1794	1678
R	Douglas W, L3 Ext.	1	60.0	1.00	2246	2080	1929	1794	1678

[a]Delay time equals the red time at the intersection of Main and Douglas Streets. The percent delay time is the red time total cycle time ratio. Delay on Links L, Q, and R are 100 percent because these vehicles may be in these queue links more than a full signal cycle.

[b]See Appendix B for example calculation; the CO emission factor equals 100 g/mi (input to CALINE-3). The emission rates in micrograms per meter per second per lane are found in Table B-1.

The CO concentration estimates for the no left turn cases for each meteorological condition for each season and year of analysis are shown in Tables C-5 through C-8 in Appendix C. Tables C-5 and C-7 present the 1-hour CO values for all links combined. As shown in these two tables, the maximum concentration typically occurs in January of each year with winds from the east northeast (wind direction 60 to 80 degrees). Tables C-6 and C-8 present the individual link contributions to the maximum study period concentration. Through-links F and G and queue-links N,O,P, and Q contribute the greatest percentages to the total.

The maximum calibrated 8-hour CO concentration of 9.9 $\mu g/m^3$ for I/M and no left turns allowed occurred in July 1983. Other years for this case were less than the 8-hour NAAQS of 10 mg/m^3 for both seasons. With no I/M and no left turns, the maximum 8-hour concentration was estimated in July 1983 at 12.2 mg/m^3. Table 16 presents the 8-hour values for the cases with no left turns allowed.

4.5 SUMMARY OF SPM SITE CO IMPACTS

The results presented in Sections 4.3 and 4.4 indicate that the SPM site is less than the 1-hour NAAQS for all cases, which agrees with measured values over the lifetime of the monitor. For an 8-hour averaging period, CO concentrations are estimated for several cases, which will enable the Wichita nonattainment area to meet the NAAQS for future years. Table 17 summarizes the 8-hour concentration estimates for all scenarios (presented separately in Tables 11 and 16). This table shows the general progression of CO concentrations for each year from 1983 to 1987 under each I/M and left-turn scenario for the two seasons.

TABLE 16. MAXIMUM ESTIMATED 8-HOUR CONCENTRATION OF CO AT THE SPM SITE IN WICHITA, KANSAS, WITH NO LEFT-HAND TURNS (mg/m^3)

Year	Month	I/M, no left turns	No I/M, no left turns
1983	January	8.6	10.2
1984	January	7.7	9.7
1985	January	7.0	9.1
1986	January	6.5	8.5
1987	January	6.1	8.2
1983	July	9.9	12.2
1984	July	8.3	11.4
1985	July	7.5	10.8
1986	July	6.7	10.0
1987	July	6.2	9.2

TABLE 17. MAXIMUM ESTIMATED 8-HOUR CONCENTRATION OF CO AT THE SPECIAL PURPOSE MONITOR IN WICHITA, KANSAS
(Calibrated mg/m³)

Year	Month	I/M, left turn	No I/M, left turn	I/M, no left turn	No I/M, no left turn
1983	January	9.4	11.2	8.6	10.2
1984	January	8.1	10.6	7.7	9.7
1985	January	7.4	10.0	7.0	9.1
1986	January	6.9	9.2	6.5	8.5
1987	January	6.5	8.9	6.1	8.2
1983	July	10.8	13.6	9.9	12.2
1984	July	9.0	12.5	8.3	11.4
1985	July	8.1	11.6	7.5	10.8
1986	July	7.4	11.0	6.7	10.0
1987	July	6.6	10.3	6.2	9.2

In terms of actual case occurrences for 1983, 1984, and 1985, the scenarios were as follows (the second maximum 8-hour concentration for the year is included):

1983	I/M with left turns	10.8 mg/m^3
1984	I/M with left turns	9.0 mg/m^3
1985	I/M with no left turns	7.5 mg/m^3

The logical progression to ensure future-year attainment is to include I/M. As shown in Table 17, with I/M included, the area will be in attainment in 1985, 1986, and 1987. The scenarios are:

1985	I/M with left turns	8.1 mg/m^3
1985	I/M and no left turns	7.5 mg/m^3
1986	I/M with left turns	7.4 mg/m^3
1986	I/M and no left turns	6.7 mg/m^3
1987	I/M with left turns	6.6 mg/m^3
1987	I/M and no left turns	6.2 mg/m^3

The effect of no left turns from westbound Douglas to southbound Main ranged from 0.4 to 0.7 mg/m^3; a ban on left turns does not appear to be required if I/M is maintained. In all cases, the July estimates were greater than the January concentrations.

Further review of Table 17 for the no I/M case indicates that if I/M is dropped, the area will be in attainment by 1987 if the left-hand turn ban is maintained. With left turns allowed and no I/M program, the second maximum was predicted to continue to exceed the 8-hour NAAQS.

SECTION 5

CALCULATION OF TOTAL CO EXHAUST EMISSIONS

Total CO exhaust emissions from vehicular traffic was calculated for the nonattainment area. Because several facility types were located within the nonattainment area, a weighted emission calculation was performed. The roadway types included local traffic on arterials and collectors, and traffic on freeways and interstates.

CO emission factors were generated for calendar years 1983 through 1987 for vehicle speeds of 22, 27, and 46 mph representing local, arterial/collector, and freeway/interstate facility types respectively.[4] All MOBILE-3 calculations were performed using an annual average ambient temperature of 56°F. All other input parameters were consistent with previous KDOT analyses using the vehicle mixes recommended for the individual roadway types. Emission factors were generated with and without I/M improvements in calendar years 1986 and 1987.

All traffic data, based on 1982 VMT's, were determined for the year of interest by interpolating between the years 1982 and 2000. Estimated daily VMT's in the nonattainment area, by facility type, were obtained from a TCM status report prepared by the Wichita Metropolitan Area Planning Department.[4] This report lists the following 1982 VMT's.

- Local: 37,945 VMT/day
- Arterials/collectors: 357,921 VMT/day
- Freeways/expressways: 113,142 VMT/day

The interpolation method yields the estimated daily VMT for each facility type. These estimates are given in Table 18. The daily VMT in Table 18 was used in conjunction with the MOBILE-3 composite emission factors developed as a function of vehicle speed or estimates of the total nonattainment area CO emissions. Table 19 presents the Mobile-3 factors used for 1983 through 1987 by facility type.

Tables 20 and 21 present calculated CO emissions for the nonattainment area as a function of calendar year and facility type. Estimates were also prepared for 1986 and 1987 without an I/M program. As shown in Table 21, the total annual CO emissions are expected to decrease in each subsequent year, even given the increase in VMT. This decrease is due to the introduction of newer vehicles into the vehicle fleet and their associated emission control requirements, and also due to the retirement of late vintage vehicles. The effect of the voluntary I/M program in 1986 and 1987 can also be quite dramatic. The voluntary program is predicted to reduce CO emissions by 20 percent when compared with no program.

TABLE 18. TOTAL VMT/DAY BY FACILITY TYPE

Facility type	1983	1984	1985	1986	1986
Local	38,561	39,178	39,794	40,411	41,027
Arterial/collector	363,736	369,550	375,365	381,179	386,994
Freeway/interstate	114,980	116,818	118,656	120,494	122,332
Total	517,277	525,546	533,815	542,084	550,353

TABLE 19. ANNUAL AVERAGE COMPOSITE EXHAUST CO EMISSION FACTORS BY FACILITY TYPE, g/mile

Facility type	1983 I/M	1984 I/M	1985 I/M	1986		1987	
				I/M	No I/M	I/M	No I/M
Local	39.17	35.13	32.15	29.61	35.63	27.33	33.31
Arterial/collector	32.20	28.79	26.39	24.12	29.06	22.07	26.97
Freeway/interstate	18.15	15.96	14.46	12.89	15.39	11.48	13.91

TABLE 20. AVERAGE DAILY EXHAUST CO EMISSIONS IN THE NONATTAINMENT AREA (lb/day)

Facility type	1983 I/M	1984 I/M	1985 I/M	1986		1987	
				I/M	No I/M	I/M	No I/M
Local	3,327	3,032	2,818	2,636	3,171	2,470	3,010
Arterial/collector	25,800	23,435	21,819	20,251	24,399	18,813	22,989
Freeway/interstate	4,597	4,107	3,779	3,421	4,084	3,093	3,748
Total	33,724	30,574	28,416	26,308	31,654	24,376	29,747

TABLE 21. ANNUAL EXHAUST CO EMISSIONS IN THE NONATTAINMENT AREA (tons/yr)

Facility type	1983 I/M	1984 I/M	1985 I/M	1986		1987	
				I/M	No I/M	I/M	No I/M
Local	607	553	514	481	579	451	549
Arterial/collector	4,708	4,277	3,982	3,696	4,453	3,433	4,196
Freeway/interstate	839	749	690	624	745	564	684
Total	6,154	5,579	5,186	4,801	5,777	4,448	5,429

SECTION 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

A dispersion modeling analysis of vehicle emissions affecting the special purpose monitor at 111 W. Douglas was conducted. The combination of MOBILE-3 CO emission factors and the CALINE-3 Model provided a reasonable modeling methodology. Considering the great variability in emissions, source characteristics, and the influencing meteorological conditions, the model-versus-monitor calibration was accurate taking into account the nature of the 8-hour concentrations.

Based on the representativeness and calibration of the 1983 and 1984 modeled concentrations at the SPM site, the SPM site will probably show attainment by 1986 or 1987. The maximum 8-hour concentrations estimated for 1987 were for no I/M and no left-hand turn ban. Including the I/M program, concentration estimates of the second-maximum CO value fell below the NAAQS. The results of this modeling analysis should be included as part of the State Implementation Plan for CO in Wichita in addition to the Transportation Control Measures already presented.

6.2 RECOMMENDATIONS

The dispersion modeling performed in the vicinity of the SPM site showed attainment of the CO NAAQS by 1985 if the voluntary I/M program is maintained. With I/M, no additional transportation control measures are required; i.e., the ban on left turns from Douglas to Main is not needed (although it

provides about a 0.5-mg/m^3 margin of safety). The recommendation here is to continue the voluntary I/M program through 1986 and continue monitoring at the SPM site until eight or more quarters are obtained with no exceedance of the NAAQS. If the monitoring program progresses as it has in 1984 and thus far in 1985, attainment should be assured.

REFERENCES

1. U.S. Environmental Protection Agency. User's Guide to MOBILE-3 (Mobile Source Emission Model). EPA-460/3-84-002. Ann Arbor, Michigan. June 1984.

2. Benson, P. E. CALINE-3 - A Versatile Dispersion Model for Predicting Air Pollutant Levels Near Highways and Arterial Streets. Report No. FHWA/CA/TL-79/23. California Department of Transportation. Sacramento, California. November 1979.

3. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised): Procedures for Evaluating Air Quality Impact of New Stationary Sources. EPA-450/4-77-001. Research Triangle Park, North Carolina. October 1977.

4. Kansas Department of Transportation. Wichita Carbon Monoxide Dispersion Modeling Study. Topeka, Kansas. March 1980.

5. U.S. Environmental Protection Agency. Region I Mobile Source Modeling Procedures. Boston, Massachusetts. No date.

6. PEI Associates, Inc. On-Site Observations. July 13-14, 1984. No report.

APPENDIX A

TRAFFIC COUNTS FOR MAIN AND DOUGLAS STREETS

DEPARTMENT OF OPERATIONS AND MAINTENANCE
TRAFFIC ENGINEERING
STREET INVENTORY SYSTEM

TRAFFIC RECORD

SIS420CO

DON'T USE

(CHECK ONE)
PEDESTRIAN ☐ P
VEHICLE ☐ V

TRAN ☐

START: HOUR 3pm DATE: YR 19 84 MO 07 DA 13

STOP: HOUR 8am DATE: YR 19 84 MO 07 DA 16

COUNTER NUMBER A

STREET ON Douglas E B

LOCATION 01 TO: NW

24 HOUR TOTAL 17516 FACTOR

24 HOUR AVERAGE TRAFFIC

DAY OF WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	PEAK HR
DATE	7/15	7/16				7/13	7/14	
HOUR				AM				
12-1	454	1010					482	
1-2	413	23					375	
2-3	354	12					319	
3-4	245	13					182	
4-5	108	10					104	
5-6	31	36					38	
6-7	23	151					41	
7-8	46	441					108	
8-9	33						231	
9-10	116						287	
10-11	154						409	
11-12	177						424	
				PM				
12-1	317						456	
1-2	313						484	
2-3	275					410	372	
3-4	250					433	316	
4-5	221					583	284	
5-6	243					565	317	
6-7	222					291	222	
7-8	145					313	302	
8-9	241					245	245	
9-10	238					468	447	
10-11	250					572	533	
11-12	146					503	539	
TOTAL	5103	810				4133	7523	
% AVG WK DAY								

SURFACE TYPE 2 lane CONDITION

REMARKS

284-01-010
(Rev. 4/81) See Procedure SIS-15

SIGNED (Andrews)

DEPARTMENT OF OPERATIONS AND MAINTENANCE
TRAFFIC ENGINEERING
STREET INVENTORY SYSTEM

TRAFFIC RECORD

SIS420CO

(CHECK ONE)

DON'T USE | TRAN

PEDESTRIAN ☐ P

VEHICLE ☑ V

COUNTER NUMBER 2

START: HOUR 3pm DATE: YR 19 84 MO 07 DA 13

STOP: HOUR 8am DATE: YR 19 84 MO 07 DA 16

STREET ON Douglas WB.

LOCATION W to E Milatia

24 HOUR TOTAL 19496 FACTOR

24 HOUR AVERAGE TRAFFIC

DAY OF WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	PEAK HR
DATE	7/15	7/16				7/13	7/14	
HOUR				AM				
12-1	459	64					420	
1-2	422	36					407	
2-3	431	19					361	
3-4	236	22					167	
4-5	80	72					62	
5-6	34	41					33	
6-7	40	114					163	
7-8	54	510					111	
8-9	86						220	
9-10	169						314	
10-11	197						445	
11-12	221						483	
				PM				
12-1	317						471	
1-2	281						445	
2-3	281					143	414	
3-4	285					952	433	
4-5	255					1065	362	
5-6	246					1029	321	
6-7	232					492	259	
7-8	231					362	324	
8-9	213					338	318	
9-10	235					514	410	
10-11	214					527	469	
11-12	132					554	454	
TOTAL	5431	838				5481	7746	
% AVG WK DAY								

SURFACE TYPE 2 lane CONDITION

REMARKS

284-01-010
(Rev. 4/81) See Procedure SIS-15

SIGNED Anderson

DEPARTMENT OF OPERATIONS AND MAINTENANCE
TRAFFIC ENGINEERING
STREET INVENTORY SYSTEM

TRAFFIC RECORD

SIS420C0

(CHECK ONE)

PEDESTRIAN ☐ P

VEHICLE ☑ V

DON'T USE ☐ (1) ☐☐☐☐☐ (2-6) ☐☐☐☐☐ (7-11) ☐ (12) 90 (13-14) TRAN ☐ (15)

COUNTER NUMBER 6 (17)

START: HOUR 1pm DATE: YR 19 85 (18-19) MO 03 (20-21) DA 29 (22-23)

STOP: HOUR 7 Am DATE: YR 19 85 MO 04 DA 01

STREET ON Douglas E.B

LOCATION W of Main (24-53)

24 HOUR TOTAL ☐☐☐☐☐ (54-58) FACTOR ☐☐☐☐ (59-62) 24 HOUR AVERAGE TRAFFIC _____

DAY OF WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	PEAK HR
DATE	3-31	4-1				3-29	3-30	
HOUR				AM				
12-1	269	33					385	
1-2	216	13					205	
2-3	79	8					67	
3-4	49	6					24	
4-5	31	23					16	
5-6	14	31					26	
6-7	18	206					88	
7-8	41	779					190	
8-9	82						298	
9-10	201						471	
10-11	248						515	
11-12	269						615	
				PM				
12-1	509						681	
1-2	498					758	668	
2-3	584					716	608	
3-4	517					756	532	
4-5	485					830	443	
5-6	509					791	397	
6-7	317					411	350	
7-8	250					341	373	
8-9	226					354	320	
9-10	162					456	399	
10-11	118					(614)	337	
11-12	46					501	339	
TOTAL	5238	1099				6528	8407	
% AVG WK DAY								

SURFACE TYPE 3 ln CONDITION _____

REMARKS 85 Special - Milke)

284-01-010
(Rev. 4/81) See Procedure SIS-15 A-4 SIGNED Anderson

DEPARTMENT OF OPERATIONS AND MAINTENANCE
TRAFFIC ENGINEERING
STREET INVENTORY SYSTEM

TRAFFIC RECORD

SIS420C0

(CHECK ONE)

PEDESTRIAN ☐ P (16)

VEHICLE ☑ V (16)

DON'T USE (1) (2-6) (7-11) (12) 90 (13-14) TRAN (15)

START: HOUR 1pm DATE: YR 19 85 (18-19) MO 03 (20-21) DA 29 (22-23)

COUNTER NUMBER 8 (17)

STOP: HOUR 7am DATE: YR 19 85 MO 04 DA 01

STREET ON Douglas N.B.

LOCATION W of Main (24-53)

24 HOUR TOTAL (54-58) FACTOR (59-62) 24 HOUR AVERAGE TRAFFIC

DAY OF WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	PEAK HR
DATE	3-31	4-1				3-29	3-30	
HOUR				AM				
12-1	497	30					630	
1-2	203	17					261	
2-3	117	16					74	
3-4	51	10					49	
4-5	45	23					30	
5-6	32	41					24	
6-7	35	149					65	
7-8	46	518					173	
8-9	96						249	
9-10	200						364	
10-11	226						454	
11-12	250						539	
				PM				
12-1	340						654	
1-2	356					943	522	
2-3	460					930	507	
3-4	377					909	463	
4-5	381					1148	434	
5-6	273					948	413	
6-7	231					431	320	
7-8	213					288	347	
8-9	158					245	364	
9-10	98					742	551	
10-11	99					710	670	
11-12	55					629	640	
TOTAL	4889	804				8113	8697	
% AVG WK DAY								

SURFACE TYPE 3 lv CONDITION

REMARKS 85 Special - Milke

284-01-010
(Rev. 4/81) See Procedure SIS-15 A-5 SIGNED Anderson

CONTINUOUS TRAFFIC COUNT STATION - WEEKLY TRAFFIC SUMMARY

KANSAS DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING

MAIN SOUTH OF DOUGLAS

STATION NUMBER 5-630-9000-70

WEEK BEGINNING MONDAY JANUARY 9, 1984

HOUR	DAY DATE	MON 1- 9	TUE 1-10	WED 1-11	THU 1-12	FRI 1-13	SAT 1-14	SUN 1-15	TOTAL
12- 1 AM		57	93	105	60	86	516	412	1329
1- 2 AM		33	43	41	82	53	394	335	981
2- 3 AM		16	32	29	46	45	172	235	575
3- 4 AM		17	24	24	22	24	109	105	325
4- 5 AM		31	24	20	22	38	48	43	226
5- 6 AM		35	43	42	40	46	30	28	264
6- 7 AM		240	224	244	227	260	88	78	1361
7- 8 AM		843	883	780	970	914	197	112	4699
8- 9 AM		987	961	1025	1066	1045	323	125	5532
9-10 AM		794	865	758	860	808	424	240	4789
10-11 AM		899	824	842	910	922	675	221	5293
11-12 AM		1080	1124	1116	1038	1188	718	246	6510
12- 1 PM		1273	1154	1173	1165	1365	704	413	7247
1- 2 PM		1194	1145	1149	1133	1240	706	372	6939
2- 3 PM		1035	1099	956	1007	1151	624	740	6612
3- 4 PM		1214	1148	1091	1156	1304	678	433	7014
4- 5 PM		1474	1357	1381	1371	1625	536	337	8121
5- 6 PM		1468	1520	1454	1381	1607	431	300	8201
6- 7 PM		575	623	700	579	617	404	240	3738
7- 8 PM		482	403	616	420	493	813	197	3424
8- 9 PM		239	258	382	315	449	422	190	2255
9-10 PM		245	255	323	274	573	474	128	2276
10-11 PM		191	207	274	244	628	487	119	2150
11-12 PM		150	170	215	162	668	531	108	2004
TOTAL		14572	14523	14810	14550	17149	10504	5757	91865
% DAY IS OF WEEK		111.0	110.7	112.9	110.8	130.7	80.0	43.9	700.0

REMARKS:
* INDICATES REVISED HOURLY VOLUME.

CLASSIFICATION TRAFFIC COUNT STATION - WEEKLY TRAFFIC SUMMARY

ARKANSAS DEPARTMENT OF TRANSPORTATION PLANNING

MAIN SOUTH OF

Reproduced from best available copy.

STATION NUMBER S-630-9000-70

FOR BEGINNING MONDAY APRIL 6, 1986

DAY BEGIN	MON	TUE	WED	THU	FRI	SAT	SUN	TOTAL
HOUR								
12- 1 AM	59	90	93	91	114	507	390	1353
1- 2 AM	33	54	27	71	60	365	357	969
2- 3 AM	14	28	30	37	24	299	263	703
3- 4 AM	25	17	11	26	37	164	115	399
4- 5 AM	35	32	37	27	28	43	30	222
5- 6 AM	43	45	39	48	43	40	19	282
6- 7 AM	203	203	217	225	207	103	50	1253
7- 8 AM	401	659	745	675	941	214	114	4611
8- 9 AM	1147	934	1033	1064	1047	539	115	5670
9-10 AM	942	733	837	833	974	531	229	4896
10-11 AM	964	737	827	996	1061	613	294	5438
11-12 AM	1134	943	1130	1065	1237	718	374	6507
12- 1 PM	1330	1235	1262	1120	1417	763	520	7069
1- 2 PM	1067	1171	1161	1097	1171	695	479	7021
2- 3 PM	1173	1103	1117	970	1136	603	560	6661
3- 4 PM	1027	1024	1160	943	1149	612	403	6733
4- 5 PM	1330	1299	1299	1309	1394	550	395	7675
5- 6 PM	1434	1447	1343	1301	1376	470	344	7715
6- 7 PM	630	716	742	671	724	291	271	4145
7- 8 PM	477	503	499	509	544	315	217	3264
8- 9 PM	397	378	421	334	379	301	263	2375
9-10 PM	307	321	344	296	338	400	142	2141
10-11 PM	214	174	224	225	595	339	191	2172
11-12 PM	181	139	175	175	681	315	142	1973
TOTAL	15761	14497	15578	14015	16902	10351	6378	92001
% DAY OF WEEK TOTAL:	17.1	15.8	16.9	15.2	18.4	11.2	6.9	100.0

* INDICATES DAILY PEAK HOURLY VOLUME.

CONTINUOUS TRAFFIC COUNT STATION - WEEKLY TRAFFIC SUMMARY

KANSAS DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING

MAIN SOUTH OF DOUGLAS

STATION NUMBER 5-630-9000-70

WEEK BEGINNING MONDAY JULY 23, 1984

DAY / DATE / HOUR	MON 7-23	TUE 7-24	WED 7-25	THU 7-26	FRI 7-27	SAT 7-28	SUN 7-29	TOTAL
12- 1 AM	72	91	101	123	137	435	423	1382
1- 2 AM	43	56	59	70	72	335	308	943
2- 3 AM	22	33	48	45	31	255	317	751
3- 4 AM	25	16	24	29	44	147	211	496
4- 5 AM	22	25	19	29	30	49	63	237
5- 6 AM	54	57	58	58	65	29	24	345
6- 7 AM	213	208	208	207	197	85	38	1156
7- 8 AM	792	825	812	791	775	196	91	4282
8- 9 AM	946	942	897	902	848	290	101	4926
9-10 AM	759	760	727	761	761	391	209	4363
10-11 AM	863	791	812	827	876	492	224	4885
11-12 AM	1055	944	1064	957	1094	584	251	5949
12- 1 PM	1103	1053	1075	1097	1279	545	385	6537
1- 2 PM	938	963	927	905	1113	723	505	6080
2- 3 PM	825	955	940	824	996	507	438	5485
3- 4 PM	993	985	873	914	1092	539	373	5769
4- 5 PM	1220	1191	1202	1143	1312	446	301	6815
5- 6 PM	1294	1295	1295	1345	1325	355	277	7187
6- 7 PM	494	508	537	545	577	315	385	3361
7- 8 PM	399	357	563	482	459	427	297	2934
8- 9 PM	322	306	361	345	365	273	246	2218
9-10 PM	293	335	330	305	509	449	265	2486
10-11 PM	221	262	335	294	618	632	217	2579
11-12 PM	182	209	205	204	562	559	144	2065
TOTAL	13150	13167	13473	13202	15142	9058	6094	83286
% DAY IS OF WEEK	110.5	110.7	113.2	111.0	127.3	76.1	51.2	700.0

REMARKS:

* INDICATES REVISED HOURLY VOLUME.

APPENDIX B

EXAMPLE CALCULATION OF IDLE AND QUEUE EMISSION FACTORS

Idle Emission Factors for CO - Example Calculations

1983: CO idle emissions = 7.44 g/veh min = E

To convert to emissions per length per time per lane multiply idle emissions by unit conversions and divide by average vehicle length:

$$E' \ (7.44 \text{ g/veh min}) \left(\frac{1 \times 10^6 \ \mu g}{g}\right) \left(\frac{\text{min}}{60 \text{ sec}}\right) \left(\frac{\text{veh}}{4.35 \text{ m}}\right) = 28505.7 \ \mu g/m \text{ sec lane}$$

Total emissions (Q_1) are obtained by multiplying by the number of lanes in the queue and the delay time percentage:

$$Q_1 = (28505.7 \ \mu g/m \text{ sec lane}) \text{ (No. lanes) (percent red time)}$$

Noting that this Q_1 is the same as the resulting total link emissions in CALINE-3 and that the equation used in Caline-3 is:

$$Q_1 = (0.1726) \text{ (EF) (VPH)}$$

where:

EF is the CO emission factor in g/mi
VPH is the number of vehicles per hour

Because Q_1 is calculated above for queue links but CALINE-3 requires EF and VPH to be input, EF is arbitrarily specified at 100 g/mi and VPH is calculated:

$$\text{VPH} = \frac{Q_1}{(0.1726) \ (100 \text{ g/mi})}$$

Specifying these EF and VPH as inputs to CALINE-3 results in the appropriate emissions assigned to the queuing links.

Table B-1 presents the CO idle emissions (E) and the idle emission rate per second per lane (E') for each year.

TABLE B-1. IDLE CO EMISSION RATE
(by year)

	1983	1984	1985	1986	1987
CO idle emissions,[a] g/veh per min					
With I/M	7.44	6.10	5.30	4.73	4.25
Without I/M	10.12	9.37	8.69	8.08	7.56
CO emission rate,[b] µg/m per s per lane					
With I/M	28505.7	23371.6	20306.5	18122.6	16283.5
Without I/M	38773.9	35900.4	33295.0	30957.9	28965.5

[a] E = idle emissions.

[b] E' = idle emission rate.

APPENDIX C

1-HOUR ESTIMATED CONCENTRATIONS OF CO AT THE SPM SITE

TABLE C-1. ESTIMATED 1-HOUR CONCENTRATIONS OF CO AT THE SPECIAL-PURPOSE MONITOR FOR I/M AND LEFT TURNS FROM DOUGLAS[a]
(ppm)

Wind direction, degrees	January 1983	July 1983	January 1984	July 1984	January 1985	July 1985	January 1986	July 1986	January 1987	July 1987
270	5.3	3.3	4.9	3.0	4.6	2.7	4.4	2.6	4.2	2.3
280	6.2	4.3	5.7	3.7	5.4	3.4	5.0	3.2	4.8	2.9
290	6.6	4.9	6.1	4.3	5.6	3.8	5.3	3.7	5.0	3.4
300	6.9	5.4	6.4	4.8	6.0	4.2	5.5	4.0	5.1	3.8
310	7.0	5.8	6.4	4.9	5.8	4.4	5.4	4.1	5.1	3.7
320	6.9	5.7	6.3	5.0	5.8	4.5	5.4	4.2	5.0	3.8
330	6.7	5.6	6.2	4.9	5.7	4.4	5.2	4.0	4.9	3.7
340	6.6	5.6	6.2	5.1	5.7	4.3	5.2	4.1	4.9	3.7
350	6.9	6.0	6.3	5.2	5.7	4.6	5.2	4.2	5.0	3.8
360	7.3	6.4	6.7	5.6	6.0	4.9	5.5	4.6	5.3	4.1
10	7.7	6.8	7.1	6.0	6.5	5.3	6.0	5.0	5.6	4.5
20	8.3	7.7	7.6	6.8	6.8	5.7	6.3	5.4	5.9	4.9
30	9.1	8.8	8.2	7.5	7.4	6.4	6.9	6.1	6.3	5.5
40	9.9	9.8	8.8	8.4	7.9	7.2	7.2	6.8	6.9	6.1
50	10.4	10.5	9.3	8.9	8.6	7.9	7.7	7.2	7.3	6.6
60	11.3[b]	11.2[b]	9.8[b]	9.4[b]	9.2	8.5[b]	8.5[b]	7.5[b]	7.8[b]	6.8[b]
70	11.7[b]	11.5[b]	10.1[b]	9.6[b]	9.2[b]	8.6[b]	8.6[b]	7.9[b]	8.1[b]	7.0[b]
80	11.0	10.7	9.9	9.3	9.3[b]	8.2	8.3	7.6	7.9	6.6
90	9.1	8.0	8.4	6.9	7.7	6.2	6.9	5.9	6.4	5.3

[a]CALINE-3 output.

[b]Maximum concentrations.

TABLE C-2. LINK CONTRIBUTIONS TO THE MAXIMUM 1-HOUR CO ESTIMATES FOR I/M AND LEFT TURNS

Date	Source contribution of CO/link (ppm) for I/M with left turns																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
January 1983	0.2	0.2	0.2	0.5	0.4	1.0	0.7	0.3	0.1	0.3	0.4	0.3	0.2	0.9	1.5	0.5	0.7	0.0
July 1983	0.1	0.1	0.2	0.4	0.3	0.8	0.6	0.4	0.2	0.4	0.6	0.4	0.3	1.3	2.1	0.7	1.1	0.0
January 1984	0.1	0.2	0.2	0.5	0.4	0.9	0.6	0.2	0.1	0.2	0.3	0.2	0.1	0.7	1.2	0.4	0.6	0.0
July 1984	0.1	0.1	0.1	0.4	0.3	0.7	0.5	0.3	0.2	0.3	0.5	0.3	0.2	1.0	1.7	0.6	0.9	0.0
January 1985	0.1	0.2	0.1	0.4	0.5	0.8	0.9	0.1	0.0	0.2	0.3	0.2	0.2	0.4	0.7	0.4	0.8	0.0
July 1985	0.1	0.1	0.1	0.3	0.3	0.7	0.4	0.3	0.1	0.3	0.4	0.3	0.2	0.9	1.5	0.5	0.8	0.0
January 1986	0.1	0.1	0.2	0.4	0.3	0.8	0.5	0.2	0.1	0.2	0.3	0.2	0.2	0.6	0.9	0.3	0.5	0.0
July 1986	0.1	0.1	0.1	0.3	0.2	0.6	0.4	0.3	0.1	0.3	0.4	0.3	0.2	0.8	1.3	0.4	0.7	0.0
January 1987	0.1	0.1	0.2	0.4	0.3	0.8	0.5	0.2	0.1	0.2	0.2	0.2	0.1	0.5	0.8	0.3	0.4	0.0
July 1987	0.1	0.1	0.1	0.3	0.2	0.6	0.4	0.2	0.1	0.2	0.3	0.2	0.1	0.7	1.2	0.4	0.6	0.0

TABLE C-3. ESTIMATED 1-HOUR CONCENTRATIONS OF CO AT THE SPECIAL-PURPOSE MONITOR FOR NO I/M AND LEFT TURNS FROM DOUGLAS[a]
(ppm)

Wind direction, degrees	January 1983	July 1983	January 1984	July 1984	January 1985	July 1985	January 1986	July 1986	January 1987	July 1987
270	5.6	3.6	5.4	3.3	5.1	3.2	4.8	3.0	4.7	2.8
280	6.8	4.8	6.5	4.5	6.0	4.3	5.8	4.0	5.5	3.7
290	7.4	5.9	7.0	5.5	6.6	5.1	6.2	4.9	6.0	4.5
300	7.7	6.5	7.3	6.2	7.0	5.7	6.6	5.3	6.2	4.9
310	7.8	7.1	7.6	6.4	7.0	6.1	6.7	5.6	6.3	5.3
320	7.9	7.0	7.5	6.5	7.1	6.0	6.5	5.7	6.3	5.4
330	7.6	6.9	7.3	6.4	6.9	5.9	6.4	5.7	6.1	5.2
340	7.8	6.9	7.4	6.4	6.9	6.0	6.4	5.6	6.1	5.3
350	8.1	7.3	7.7	6.9	7.2	6.3	6.6	6.0	6.3	5.6
360	8.5	8.1	8.1	7.3	7.6	6.8	7.0	6.5	6.7	6.0
10	9.0	8.7	8.5	8.1	8.0	7.3	7.4	7.0	7.2	6.5
20	9.7	9.8	9.3	9.0	8.7	8.3	8.2	7.9	7.7	7.4
30	10.9	11.0	10.3	10.2	9.6	9.5	9.0	9.1	8.5	8.5
40	11.8	12.4	11.2	11.4	10.5	10.8	9.9	10.1	9.3	9.4
50	12.7	13.3	11.9	12.5	11.2	11.4[b]	10.4	10.7	9.9	10.1
60	13.5[b]	14.0[b]	12.5[b]	13.2[b]	11.9[b]	12.4[b]	11.0[b]	11.3[b]	10.6[b]	10.5[b]
70	14.0[b]	14.5[b]	13.2[b]	13.3[b]	12.5[b]	12.4[b]	11.5[b]	11.7[b]	11.1[b]	11.0[b]
80	13.5	13.5	12.5	12.5	11.7	11.6	11.1	11.1	10.5	10.1
90	10.5	10.0	10.0	9.3	9.3	8.7	8.8	8.1	8.4	7.5

[a]CALINE-3 output.

[b]Maximum concentrations.

TABLE C-4. LINK CONTRIBUTIONS TO THE MAXIMUM 1-HOUR CO ESTIMATES FOR NO I/M AND LEFT TURNS

Date	Source contribution of CO/link (ppm) for no I/M with left turns																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
January 1983	0.2	0.2	0.2	0.6	0.4	1.2	0.8	0.4	0.2	0.4	0.6	0.4	0.2	1.2	2.0	0.7	1.0	0.0
July 1983	0.1	0.1	0.2	0.5	0.4	1.0	0.6	0.6	0.3	0.6	0.8	0.6	0.3	1.7	2.9	0.9	1.4	0.0
January 1984	0.2	0.2	0.2	0.6	0.4	1.1	0.7	0.4	0.2	0.4	0.5	0.4	0.2	1.1	1.0	0.6	0.9	0.0
July 1984	0.1	0.1	0.2	0.5	0.3	0.9	0.6	0.5	0.2	0.5	0.7	0.5	0.3	1.6	2.7	0.9	1.3	0.0
January 1985	0.2	0.2	0.2	0.6	0.4	1.1	0.7	0.4	0.2	0.3	0.5	0.3	0.2	1.0	1.7	0.6	0.9	0.0
July 1985	0.1	0.1	0.2	0.4	0.3	0.8	0.5	0.5	0.2	0.5	0.7	0.5	0.3	1.5	2.5	0.8	1.2	0.0
January 1986	0.2	0.2	0.2	0.5	0.4	1.0	0.7	0.3	0.1	0.3	0.4	0.3	0.2	1.0	1.6	0.5	0.8	0.0
July 1986	0.1	0.1	0.1	0.4	0.3	0.8	0.5	0.5	0.2	0.5	0.6	0.4	0.3	1.4	2.3	0.7	1.2	0.0
July 1986[a]	0.1	0.0	0.2	0.2	0.1	0.6	0.2	0.7	0.3	0.3	0.3	0.2	0.1	1.3	1.8	0.4	0.3	0.0
January 1987	0.2	0.2	0.2	0.5	0.4	1.0	0.6	0.3	0.1	0.3	0.4	0.3	0.2	0.9	1.5	0.5	0.8	0.0
July 1987	0.1	0.1	0.1	0.4	0.3	0.7	0.5	0.4	0.2	0.4	0.6	0.4	0.3	1.3	2.2	0.7	1.1	0.0

TABLE C-5. ESTIMATED 1-HOUR CONCENTRATIONS OF CO FOR EACH YEAR AT THE SPECIAL-PURPOSE MONITOR FOR I/M AND NO LEFT TURNS FROM DOUGLAS[a]

(ppm)

Wind direction, degrees	January 1983	July 1983	January 1984	July 1984	January 1985	July 1985	January 1986	July 1986	January 1987	July 1987
270	5.3	3.3	5.0	3.0	4.7	2.8	4.4	2.6	4.2	2.3
280	6.2	4.3	5.7	3.8	5.5	3.4	5.0	3.2	4.8	3.0
290	6.6	5.0	6.2	4.3	5.6	3.9	5.3	3.7	5.1	3.4
300	6.9	5.5	6.4	4.8	6.0	4.3	5.6	4.0	5.2	3.8
310	7.1	5.8	6.4	5.0	5.9	4.4	5.4	4.1	5.1	3.8
320	6.9	5.8	6.4	5.0	5.8	4.5	5.4	4.3	5.1	3.8
330	6.8	5.7	6.2	4.9	5.7	4.5	5.3	4.0	5.0	3.7
340	6.7	5.7	6.2	5.1	5.7	4.4	5.3	4.1	4.9	3.7
350	7.1	6.0	6.3	5.2	5.7	4.7	5.3	4.2	5.0	3.8
360	7.4	6.4	6.7	5.6	6.2	5.0	5.6	4.6	5.3	4.1
10	7.8	6.9	7.1	6.0	6.6	5.4	6.1	5.0	5.7	4.5
20	8.4	7.7	7.6	6.8	7.0	5.9	6.4	5.4	5.9	4.9
30	9.2	8.9	8.2	7.5	7.5	6.6	7.0	6.1	6.3	5.5
40	10.0	9.8	8.8	8.5	8.0	7.3	7.3	6.8	6.9	6.2[b]
50	10.5[b]	10.3[b]	9.2	8.7[b]	8.5[b]	7.8[b]	7.7[b]	7.1[b]	7.3	6.6
60	10.8[b]	10.6[b]	9.4[b]	8.9[b]	8.8[b]	8.0[b]	8.1[b]	7.2[b]	7.5[b]	6.4
70	10.8[b]	10.2	9.6[b]	8.7	8.5	7.7	8.0	7.0	7.6[b]	6.4
80	10.0	9.3	9.0	8.0	8.6	7.3	7.6	6.7	7.3	5.9
90	8.3	7.1	7.8	6.1	7.1	5.5	6.4	5.1	6.0	4.7

[a]CALINE-3 output.

[b]Maximum concentrations.

TABLE C-6. LINK CONTRIBUTIONS TO THE MAXIMUM 1-HOUR CO ESTIMATES FOR I/M AND NO LEFT TURNS

Date	Source contribution of CO/link (ppm) for I/M with no left turns														
	A	B	C	D	E	F	G	H	I	J	N	O	P	Q	R
January 1983	0.2	0.2	0.2	0.5	0.4	1.0	0.7	0.3	0.1	0.3	0.9	1.5	0.5	0.7	0.0
January 1983	0.2	0.1	0.4	0.4	0.2	1.0	0.3	0.7	0.3	0.3	1.2	1.7	0.4	0.3	0.0
July 1983	0.2	0.1	0.3	0.4	0.1	0.9	0.3	0.9	0.4	0.4	1.7	2.5	0.5	0.4	0.0
January 1984	0.2	0.2	0.2	0.5	0.4	0.9	0.6	0.2	0.1	0.2	0.7	1.2	0.4	0.6	0.0
July 1984	0.2	0.1	0.3	0.3	0.1	0.8	0.2	0.7	0.3	0.3	1.4	2.0	0.4	0.4	0.0
January 1985	0.2	0.1	0.3	0.4	0.1	0.9	0.3	0.5	0.2	0.2	0.9	1.2	0.3	0.2	0.0
July 1985	0.2	0.1	0.2	0.3	0.1	0.7	0.2	0.7	0.3	0.3	1.2	1.7	0.4	0.3	0.0
January 1986	0.2	0.1	0.3	0.3	0.1	0.9	0.3	0.4	0.2	0.2	0.8	1.1	0.2	0.2	0.0
July 1986	0.1	0.1	0.2	0.3	0.1	0.6	0.2	0.6	0.2	0.2	1.1	1.6	0.3	0.3	0.0
January 1987	0.1	0.1	0.2	0.4	0.3	0.8	0.5	0.2	0.1	0.2	0.5	0.8	0.3	0.4	0.0
July 1987	0.2	0.0	0.3	0.1	0.0	0.6	0.1	0.8	0.4	0.1	1.1	1.4	0.2	0.1	0.0

TABLE C-7. ESTIMATED 1-HOUR CONCENTRATIONS OF CO FOR EACH YEAR AT THE SPECIAL-PURPOSE MONITOR FOR NO I/M AND NO LEFT TURNS FROM DOUGLAS[a]
(ppm)

Wind direction, degrees	January 1983	July 1983	January 1984	July 1984	January 1985	July 1985	January 1986	July 1986	January 1987	July 1987
270	5.7	3.7	5.4	3.3	5.1	3.2	4.8	3.0	4.7	2.8
280	6.8	4.9	6.5	4.5	6.1	4.3	5.9	4.1	5.5	3.7
290	7.4	6.0	7.1	5.5	6.7	5.2	6.2	4.9	6.0	4.5
300	7.8	6.5	7.4	6.2	7.0	5.8	6.6	5.3	6.3	5.0
310	7.8	7.1	7.6	6.5	7.1	6.1	6.8	5.7	6.3	5.4
320	8.0	7.0	7.6	6.5	7.1	6.1	6.5	5.7	6.4	5.4
330	7.7	6.9	7.3	6.4	6.9	6.0	6.5	5.7	6.2	5.2
340	7.8	6.9	7.4	6.5	6.9	6.0	6.5	5.6	6.2	5.3
350	8.1	7.3	7.7	7.0	7.3	6.3	6.8	6.0	6.4	5.6
360	8.5	8.1	8.1	7.5	7.7	6.8	7.1	6.5	6.7	6.0
10	9.0	8.7	8.6	8.2	8.2	7.4	7.5	7.0	7.2	6.5
20	9.8	9.8	9.4	9.2	8.8	8.3	8.3	7.9	7.7	7.4
30	11.0	11.1	10.4	10.3	9.6	9.6	9.1	9.1	8.6	8.5
40	11.8	12.3[b]	11.2	11.5[b]	10.6	10.8	10.0	10.0	9.4	9.5[b]
50	12.5[b]	13.0[b]	11.8	12.2[b]	11.0[b]	11.2[b]	10.3[b]	10.5[b]	9.9	9.8[b]
60	12.8[b]	13.0[b]	11.9[b]	12.2[b]	11.4[b]	11.5[b]	10.6[b]	10.7[b]	10.1[b]	9.8[b]
70	12.8[b]	12.9	12.1[b]	11.8	11.4[b]	10.9	10.6[b]	10.5	10.2[b]	9.7
80	12.1	11.6	11.3	10.8	10.4	9.9	9.9	9.5	9.5	8.7
90	9.6	8.6	9.1	8.0	8.4	7.5	7.9	7.0	7.6	6.6

[a]CALINE-3 output.

[b]Maximum concentrations.

TABLE C-8. LINK CONTRIBUTIONS TO THE MAXIMUM 1-HOUR CO ESTIMATES FOR NO I/M AND NO LEFT TURNS

Date	Source contribution of CO/link (ppm) - no I/M and no left turns														
	A	B	C	D	E	F	G	H	I	J	N	O	P	Q	R
January 1983	0.3	0.1	0.4	0.5	0.2	1.2	0.4	0.9	0.4	0.3	1.6	2.3	0.5	0.4	0.0
July 1983	0.3	0.0	0.4	0.3	0.0	0.9	0.1	1.8	0.9	0.3	2.7	3.4	0.4	0.1	0.0
January 1984	0.2	0.2	0.2	0.6	0.4	1.1	0.7	0.4	0.2	0.4	1.1	1.9	0.6	0.1	0.2
July 1984	0.3	0.0	0.4	0.2	0.0	0.9	0.1	1.7	0.8	0.3	2.5	3.2	0.3	0.1	0.0
January 1985	0.2	0.2	0.2	0.5	0.4	1.1	0.7	0.4	0.2	0.3	1.0	1.7	0.6	0.9	0.0
January 1985	0.3	0.1	0.4	0.4	0.2	1.1	0.3	0.8	0.3	0.3	1.4	2.0	0.4	0.4	0.0
July 1985	0.2	0.1	0.3	0.3	0.1	0.9	0.3	1.1	0.5	0.4	2.0	2.9	0.6	0.5	0.0
January 1986	0.2	0.2	0.2	0.5	0.4	1.0	0.7	0.3	0.1	0.3	1.0	1.6	0.5	0.8	0.0
July 1986	0.2	0.1	0.3	0.3	0.1	0.8	0.2	1.0	0.4	0.4	1.9	2.7	0.5	0.5	0.0
January 1987	0.2	0.2	0.2	0.5	0.4	1.0	0.6	0.3	0.1	0.3	0.9	1.5	0.5	0.8	0.0
July 1987	0.2	0.0	0.3	0.2	0.0	0.7	0.1	1.3	0.6	0.2	2.0	2.6	0.3	0.1	0.0

APPENDIX D

MOBILE-3 CALCULATIONS
MAIN AND DOUGLAS STREETS

```
WXOT MOBILE3.
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:  1.00      MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .999     MYR SUM NOT = 1. (WILL NORMALIZE)
*** MAIN AND DOUGLAS  THRU 15,20 MPH  JANUARY-JULY   +I/M
I/M PROGRAM SELECTED:
    START YEAR (JANUARY 1):          1981
    PRE-1981 MYR STRINGENCY RATE:    10%
    MECHANIC TRAINING PROGRAM?:      NO
    FIRST MODEL YEAR COVERED:        1968
    LAST MODEL YEAR COVERED:         2020
    VEHICLE TYPES COVERED:           LDGV
    1981 & LATER MYR TEST TYPE:      IDLE
    1981 & LATER MYR TEST CUTPOINTS: 3.0% ICO / 300 PPM IHC
TOTAL HC EMISSION FACTORS INCLUDE EVAPORATIVE HC EMISSION FACTORS.
-------------------------------------------------------------------------------------------------------------
USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983        I/M PROGRAM: YES       AMBIENT TEMP: 24.0 (F)              REGION: LOW
               ANTI-TAM. PROGRAM: NO      OPERATING MODE: 20.6 / 27.3 / 20.6   ALTITUDE:  500. FT.
  VEH. TYPE:     LDGV     LDGT1     LDGT2     LDGT      HDGV      LDDV      LDDT      HDDV      MC      ALL VEH
                 ------   ------    ------    ------    ------    ------    ------    ------    ------   ------
VEH. SPEEDS:     15.0      15.0      15.0                15.0      15.0      15.0      15.0      15.0
    VMT MIX:      .797      .094      .094                .000      .010      .000      .000      .005
COMPOSITE EMISSION FACTORS (GM/MILE)
EXHAUST  CO:    69.98    121.19    132.90    127.04      .00      1.69      .00       .00     47.95     79.92
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  CO:     6.86     10.21     10.61     10.41      .00       .18      .00       .00     -2.79      7.44
-------------------------------------------------------------------------------------------------------------
USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984        I/M PROGRAM: YES       AMBIENT TEMP: 24.0 (F)              REGION: LOW
               ANTI-TAM. PROGRAM: NO      OPERATING MODE: 20.6 / 27.3 / 20.6   ALTITUDE:  500. FT.
  VEH. TYPE:     LDGV     LDGT1     LDGT2     LDGT      HDGV      LDDV      LDDT      HDDV      MC      ALL VEH
                 ------   ------    ------    ------    ------    ------    ------    ------    ------   ------
VEH. SPEEDS:     15.0      15.0      15.0                15.0      15.0      15.0      15.0      15.0
    VMT MIX:      .797      .094      .094                .000      .010      .000      .000      .005
COMPOSITE EMISSION FACTORS (GM/MILE)
EXHAUST  CO:    61.67    119.09    126.40    122.75      .00      1.70      .00       .00     46.86     72.47
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  CO:     5.41      9.30      9.52      9.41      .00       .18      .00       .00      2.66      6.10
-------------------------------------------------------------------------------------------------------------
```

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	56.15	115.30	118.73	117.01	.00	1.71	.00	.00	46.04	67.00
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	51.99	111.03	111.15	111.09	.00	1.71	.00	.00	45.69	62.57
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	48.50	106.55	103.89	105.22	.00	1.72	.00	.00	45.51	58.68
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	39.27	71.92	84.55	78.23	.00	1.69	.00	.00	29.86	46.18
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	6.86	10.21	10.61	10.41	.00	.18	.00	.00	2.79	7.44

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	32.90	69.53	79.63	74.58	.00	1.70	.00	.00	28.69	40.41
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	5.41	9.30	9.52	9.41	.00	.18	.00	.00	2.66	6.10

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	28.52	66.06	74.03	70.05	.00	1.71	.00	.00	27.92	36.06
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	25.13	62.54	68.71	65.62	.00	1.71	.00	.00	27.61	32.52
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	22.25	58.86	63.62	61.24	.00	1.72	.00	.00	27.47	29.40
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	54.77	94.64	100.38	97.51	.00	1.28	.00	.00	36.06	62.17
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	6.84	10.21	10.61	10.41	.00	.18	.00	.00	3.79	7.44

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	48.42	92.72	95.32	94.02	.00	1.28	.00	.00	35.22	56.45
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	5.41	9.30	9.52	9.41	.00	.18	.00	.00	2.66	6.10

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	44.22	89.78	89.63	89.70	.00	1.29	.00	.00	34.61	52.29
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	41.05	86.49	84.02	85.25	.00	1.29	.00	.00	34.36	48.93
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.23

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	38.37	83.04	78.67	80.86	.00	1.30	.00	.00	34.23	45.97
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	30.62	56.13	64.03	60.08	.00	1.28	.00	.00	22.50	35.83
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	6.86	10.21	10.61	10.41	.00	.18	.00	.00	2.79	7.44

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	25.72	54.11	60.18	57.14	.00	1.28	.00	.00	21.58	31.36
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	5.41	9.30	9.52	9.41	.00	.18	.00	.00	2.66	6.10

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	22.35	51.40	55.96	53.68	.00	1.29	.00	.00	21.00	28.02
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	19.73	48.66	51.97	50.31	.00	1.29	.00	.00	20.77	25.30
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	17.51	45.79	48.18	46.98	.00	1.30	.00	.00	20.67	22.91
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

MORE? PRINT
LOL;*
0;

```
@XQT MOBILE3.
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:  1.00      MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .999     MYR SUM NOT = 1. (WILL NORMALIZE)
*** MAIN AND DOUGLAS  THRU 10,25 MPH  JANUARY-JULY   +I/M
I/M PROGRAM SELECTED:
    START YEAR (JANUARY 1):          1981
    PRE-1981 MYR STRINGENCY RATE:    10%
    MECHANIC TRAINING PROGRAM?:      NO
    FIRST MODEL YEAR COVERED:        1968
    LAST MODEL YEAR COVERED:         2020
    VEHICLE TYPES COVERED:           LDGV
    1981 & LATER MYR TEST TYPE:      IDLE
    1981 & LATER MYR TEST CUTPOINTS: 3.0% ICO / 300 PPM IHC
TOTAL HC EMISSION FACTORS INCLUDE EVAPORATIVE HC EMISSION FACTORS.
-------------------------------------------------------------------------------------------------------------
USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983        I/M PROGRAM: YES       AMBIENT TEMP: 24.0 (F)              REGION: LOW
                ANTI-TAM. PROGRAM: NO      OPERATING MODE: 20.6 / 27.3 / 20.6   ALTITUDE:  500. FT.
  VEH. TYPE:      LDGV     LDGT1     LDGT2      LDGT      HDGV      LDDV      LDDT      HDDV      MC      ALL VEH
                  ------   ------    ------     ------    ------    ------    ------    ------    ------  -------
VEH. SPEEDS:      10.0      10.0      10.0                 10.0      10.0      10.0      10.0      10.0
    VMT MIX:       .797      .094      .094                 .000      .010      .000      .000      .005
COMPOSITE EMISSION FACTORS (GM/MILE)
EXHAUST  CO:     97.67    169.91    197.21    183.56       .00      2.34       .00       .00     74.07    112.75
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  CO:      6.86     10.21     10.61     10.41       .00       .18       .00       .00      2.79      7.44
-------------------------------------------------------------------------------------------------------------
USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984        I/M PROGRAM: YES       AMBIENT TEMP: 24.0 (F)              REGION: LOW
                ANTI-TAM. PROGRAM: NO      OPERATING MODE: 20.6 / 27.3 / 20.6   ALTITUDE:  500. FT.
  VEH. TYPE:      LDGV     LDGT1     LDGT2      LDGT      HDGV      LDDV      LDDT      HDDV      MC      ALL VEH
                  ------   ------    ------     ------    ------    ------    ------    ------    ------  -------
VEH. SPEEDS:      10.0      10.0      10.0                 10.0      10.0      10.0      10.0      10.0
    VMT MIX:       .797      .094      .094                 .000      .010      .000      .000      .005
COMPOSITE EMISSION FACTORS (GM/MILE)
EXHAUST  CO:     84.78    165.89    186.08    175.98       .00      2.36       .00       .00     72.33    101.04
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  CO:      5.41      9.30      9.52      9.41       .00       .18       .00       .00      2.66      6.10
```

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	76.16	159.31	173.25	166.28	.00	2.37	.00	.00	70.94	92.34
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	69.60	152.23	160.76	156.49	.00	2.38	.00	.00	70.35	85.27
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	64.15	145.03	148.85	146.94	.00	2.38	.00	.00	70.03	79.13
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	55.76	101.57	125.48	113.52	.00	2.34	.00	.00	46.04	66.03
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	6.86	10.21	10.61	10.41	.00	.18	.00	.00	2.79	7.44

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	46.15	97.55	117.35	107.45	.00	2.36	.00	.00	44.24	57.23
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	5.41	9.30	9.52	9.41	.00	.18	.00	.00	2.66	6.10

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	39.53	92.01	108.26	100.14	.00	2.37	.00	.00	43.00	50.57
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	34.40	86.47	99.66	93.07	.00	2.38	.00	.00	42.49	45.15
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	30.08	80.79	91.50	86.14	.00	2.38	.00	.00	42.26	40.40
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	43.88	75.57	79.28	77.43	.00	1.01	.00	.00	28.91	49.68
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	6.86	10.21	10.61	10.41	.00	.18	.00	.00	2.79	7.44

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	30.63	65.51	61.43	63.47	.00	1.03	.00	.00	27.32	36.49
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	38.74	73.60	74.88	74.24	.00	1.02	.00	.00	28.16	44.98
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	5.41	9.30	9.52	9.41	.00	.18	.00	.00	2.66	6.10

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	35.34	71.09	70.23	70.66	.00	1.02	.00	.00	27.64	41.60
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	32.79	68.35	65.70	67.02	.00	1.02	.00	.00	27.42	38.88
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	24.58	44.96	50.77	47.87	.00	1.01	.00	.00	18.07	28.69
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	6.86	10.21	10.61	10.41	.00	.18	.00	.00	2.79	7.44

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	20.61	43.07	47.44	45.26	.00	1.02	.00	.00	17.28	25.03
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	5.41	9.30	9.52	9.41	.00	.18	.00	.00	2.66	6.10

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
\\										
*** Input Timeout ***										
>VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	17.87	40.79	43.97	42.38	.00	1.02	.00	.00	16.78	22.31
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.64	8.40	8.48	8.44	.00	.18	.00	.00	2.57	5.30

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	15.76	38.52	40.72	39.62	.00	1.02	.00	.00	16.58	20.10
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	4.14	7.53	7.52	7.53	.00	.19	.00	.00	2.54	4.73

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: YES AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	13.96	36.15	37.67	36.91	.00	1.03	.00	.00	16.50	18.16
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	3.74	6.75	6.65	6.70	.00	.19	.00	.00	2.52	4.25

@@KEPT PRINT$
EOF:258
0:>

```
@XQT MOBILE3.
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:  1.00      MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .999     MYR SUM NOT = 1. (WILL NORMALIZE)
*** MAIN AND DOUGLAS  THRU 15,20 MPH  JANUARY-JULY   NO I/M
TOTAL HC EMISSION FACTORS INCLUDE EVAPORATIVE HC EMISSION FACTORS.
```

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	83.88	121.19	132.90	127.04	.00	1.69	.00	.00	47.95	90.99
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	78.70	119.09	126.40	122.75	.00	1.70	.00	.00	46.86	86.05
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	74.10	115.30	118.73	117.01	.00	1.71	.00	.00	46.04	81.31
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	70.10	111.03	111.15	111.09	.00	1.71	.00	.00	45.69	77.00
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	66.68	106.55	103.89	105.22	.00	1.72	.00	.00	45.51	73.17
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	47.51	71.92	84.55	78.23	.00	1.69	.00	.00	29.86	52.74
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	42.92	69.53	79.63	74.58	.00	1.70	.00	.00	28.69	48.39
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	38.86	66.06	74.03	70.05	.00	1.71	.00	.00	27.92	44.30
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	9.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	35.30	62.54	68.71	65.62	.00	1.71	.00	.00	27.61	40.62
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	32.16	58.86	63.62	61.24	.00	1.72	.00	.00	27.47	37.30
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	65.53	94.64	100.38	97.51	.00	1.28	.00	.00	36.06	70.76
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YLAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	61.63	92.72	95.32	94.02	.00	1.28	.00	.00	35.22	66.99
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	58.19	89.78	89.63	89.70	.00	1.29	.00	.00	34.61	63.43
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	55.20	86.49	84.02	85.25	.00	1.29	.00	.00	34.36	60.21
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	52.64	83.04	78.67	80.86	.00	1.30	.00	.00	34.23	57.34
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	36.98	56.13	64.03	60.08	.00	1.28	.00	.00	22.50	40.89
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	33.47	54.11	60.18	57.14	.00	1.28	.00	.00	21.58	37.54
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	30.37	51.40	55.96	53.68	.00	1.29	.00	.00	21.00	34.41
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	27.65	48.66	51.97	50.31	.00	1.29	.00	.00	20.77	31.61
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	25.25	45.79	48.18	46.98	.00	1.30	.00	.00	20.67	29.07
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

PBRKPT PRINT$
LOF:'49

```
@rOT MOBILE3.
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:  1.00      MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .995     MYR SUM NOT = 1. (WILL NORMALIZE)
WARNING:   .999     MYR SUM NOT = 1. (WILL NORMALIZE)
*** MAIN AND DOUGLAS  THRU 10,25 MPH  JANUARY-JULY   NO I/M
TOTAL HC EMISSION FACTORS INCLUDE EVAPORATIVE HC EMISSION FACTORS.
```

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	117.46	169.91	197.21	183.56	.00	2.34	.00	.00	74.07	128.52
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	108.90	165.89	186.08	175.98	.00	2.36	.00	.00	72.33	120.26
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	101.24	159.31	173.25	166.28	.00	2.37	.00	.00	70.94	112.32
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	94.55	152.23	160.76	156.49	.00	2.38	.00	.00	70.35	105.15
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	88.85	145.03	148.85	146.94	.00	2.38	.00	.00	70.03	98.81
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	67.61	101.57	125.48	113.52	.00	2.34	.00	.00	46.04	75.48
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	60.51	92.55	117.35	107.45	.00	2.36	.00	.00	44.24	68.67
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	54.17	92.01	108.26	100.14	.00	2.37	.00	.00	43.00	62.24
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	48.61	86.47	99.66	93.07	.00	2.38	.00	.00	42.49	56.47
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	43.74	80.79	91.50	86.14	.00	2.38	.00	.00	42.26	51.29
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	52.47	75.57	79.28	77.43	.00	1.01	.00	.00	28.91	56.53
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	49.27	73.60	74.88	74.24	.00	1.02	.00	.00	28.16	53.38
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	46.48	71.09	70.23	70.66	.00	1.02	.00	.00	27.64	50.47
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	44.06	68.35	65.70	67.02	.00	1.02	.00	.00	27.42	47.86
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 24.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	41.99	65.51	61.43	63.47	.00	1.03	.00	.00	27.32	45.55
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1983 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	29.66	44.96	50.77	47.87	.00	1.01	.00	.00	18.07	32.74
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	10.23	10.21	10.61	10.41	.00	.18	.00	.00	2.79	10.12

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1984 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	26.79	43.07	47.44	45.26	.00	1.02	.00	.00	17.28	29.96
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	9.51	9.30	9.52	9.41	.00	.18	.00	.00	2.66	9.37

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1985 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	24.27	40.79	43.97	42.38	.00	1.02	.00	.00	16.78	27.40
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.89	8.40	8.48	8.44	.00	.18	.00	.00	2.57	8.69

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1986 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	22.07	38.52	40.72	39.62	.00	1.02	.00	.00	16.58	25.13
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	8.35	7.53	7.52	7.53	.00	.19	.00	.00	2.54	8.08

USER SUPPLIED VEH REGISTRATION DISTRIBUTIONS.
CAL. YEAR: 1987 I/M PROGRAM: NO AMBIENT TEMP: 80.0 (F) REGION: LOW
ANTI-TAM. PROGRAM: NO OPERATING MODE: 20.6 / 27.3 / 20.6 ALTITUDE: 500. FT.

VEH. TYPE:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	ALL VEH
VEH. SPEEDS:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT MIX:	.797	.094	.094		.000	.010	.000	.000	.005	
COMPOSITE EMISSION FACTORS (GM/MILE)										
EXHAUST CO:	20.12	36.15	37.67	36.91	.00	1.03	.00	.00	16.50	23.07
HOT STABILIZED IDLE EMISSION FACTORS (GM/MIN)										
IDLE CO:	7.89	6.75	6.65	6.70	.00	.19	.00	.00	2.52	7.56